

THE NORTH CAROLINA DENTAL R · E · V · I · E · W

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The Aged and Aging

THE NORTH CAROLINA DENTAL R · E · V · I · E · W

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Volume 4, Number 1

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Dean's Commentary

Recently I joined one of our faculty committees for a discussion of patient care programs at the UNC School of Dentistry. The questions of the meeting were about our expectations of patient care at the School of Dentistry in Chapel Hill. As you might expect the discussion turned to definitions of clinical excellence which most of the faculty believe to be an important part of our educational and patient care tradition. In this context, excellence was defined as excellence of technical procedure – the excellence of the preparation, the finish on the restoration, adaptation of the margin or the color match of the prosthesis.

Excellence in restorative work has been one of the hallmarks of Carolina dentistry for many years. It is no surprise that this commitment to technical excellence emerged when it did. For most of us who entered practice in the 50's, 60's and early 70's, the ravages of dental caries still were producing an overwhelming demand for restorative care. Throughout those years the focus of the dental curriculum and the realities of dental practice in North Carolina limited most of the general practitioner's attention to those technical procedures which have become a part of this tradition of clinical excellence.

As the faculty continued their discussion of what made for a good patient care program, another definition of quality began to emerge. They are beginning to realize that excellence in clinical technique must exist within a broader therapeutic context if we are to achieve quality patient care. Part of that context is an extension of clinical technique to include other clinical concerns such as periodontal care, preventive therapy, and esthetic restorations. For many of us this requires updating of some old skills or learning new ones. However, the therapeutic environment, as our faculty discussed the issue, is more than an extension of technical skills to include new areas of competence. It embraces a broad concept of patient centered care which too often does not characterize care either in dental education programs or private practice throughout North Carolina. By this I mean a therapeutic system which is characterized by a sensitivity to the convenience of the patient, attention to the comfort of the patient in receiving this care, managing their medical condition in relation to dental care, recognizes the individual appropriateness of various therapeutic measures, recognition of the broad range of populations needing special care including the elderly, and concern for not only the restorative needs but a focus on preventive therapy, esthetics, and other oral diseases. This differs from an orientation to care delivery which focuses on the convenience of the provider or efficacy in treating a particular disease. It is patient centered – not doctor centered – care.

Dentists who provide this type of service will attract and maintain an adequate and appreciative family of patients. The care and maintenance of this family of patients will require new skills of every practitioner. As for this School, we are committed to continuing to upgrade our predoctoral dental program to respond to the needs of a changing practice culture and environment. We also pledge our ongoing commitment to assisting you, the practitioner, in making the transition from excellent clinician to superb therapist.

This issue of the *North Carolina Dental Review* speaks to one of those areas where we need to expand therapeutic competence. We are living in an aging society. Just as the past World War II baby boom changed the complexion of our culture, the fact that a larger percentage of the population is living longer means that certain parts of our culture and society will change in response. Social Security, patterns of retirement, health care, recreation, and education are but just a few areas which will be profoundly altered by the aging population.

Dentistry is, of course, not immune. The technical clinical procedures required by the elderly may be essentially the same as those we impart to younger components of the populations. However, the therapeutic environment in which they are presented and the work completed must recognize the special needs of this different part of our society.

Ben D. Barker ('58)

Oral Health Status in the United States: Problems of Special Patients

James D. Beck, Ph.D.¹ and Ronald Hunt, D.D.S., M.S.²

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¹Dr. Beck is Professor and Chairman of the Department of Dental Ecology at the UNC School of Dentistry. Prior to joining the UNC faculty, Beck was Professor and Chairman of the Department of Preventive and Community Dentistry at the University of Iowa.

²Dr. Hunt is Assistant Professor and Director of the Program in Community Dentistry in the Department of Dental Ecology at the UNC School of Dentistry. Hunt was also an Assistant Professor in the Department of Preventive and Community Dentistry at the University of Iowa College of Dentistry.

Other reviews and discussions in this symposium on Oral Health Status in the United States have focused on specific dental diseases. This review focuses on a specific category of people, the so-called "special patient" population.

Characterization of the Special Patient

In this instance, the elderly and the handicapped have been singled out as special populations. It is appropriate to consider these two groups apart from the population at large because they differ by presenting many physical and mental problems that are significant in the practice of dentistry. In addition, the elderly represent an increasingly large segment of the U.S. population.

It is unfortunate that the elderly, who are defined as the cohort of people age 65 or over, are commonly thought of as the recipients of geriatric dental care. When identifying characteristics that qualify a group as a special population, it is probably not appropriate to use a chronological age criterion, because there is great variation in physical, medical, and mental conditions among people over age 65. Since the relatively healthy elderly individual, regardless of age, presents very few treatment problems to the general den-

tal practitioner, it is probably more useful to define geriatric dentistry in terms of functional status, rather than age. Therefore, we would like to propose that Ettinger's (and Beck 1984) definition of geriatric dentistry be used. He has defined geriatric dentistry as the provision of dental care for adult persons with one or more chronic, debilitating physical or mental illnesses with associated medications or psychosocial problems. It should be pointed out that although many of these conditions are often associated with increasing age, they are not a consequence of aging per se. Thus, a geriatric dental patient is a biologically compromised adult who may not be older than age 65. More specifically, two classes of geriatric patients are offered. The frail have chronic, debilitating physical, medical, and emotional problems and are able to maintain some independence in the community only with continued assistance from others. Some of these individuals are institutionalized, but the majority live in the community with the help of support services. The functionally dependent are so impaired by any combination of chronic, debilitating physical, medical, or emotional problems that they are unable to maintain any independence. These people are necessarily homebound or institutionalized.

For epidemiologic information on oral status to be useful for dentistry, data must be collected on people with different levels of functional status: (1) the healthy elderly, with minimum treatment implications, (2) the frail, which by our definition would also include adult handicapped, and (3) the functionally dependent, which would include mostly the elderly and handicapped who are institutionalized.

While this may sound like an unnecessary change in definition, it has significant implications for dentistry. For example, when most elderly people receive dental treatment, they are not readily identified as geriatric patients

by their dentists because they really are no different from younger adults, except for some normal aging changes. Thus, dentists who define "geriatric patients" as those over age 65 and who provide treatment based on the needs of those individuals are correct when they say that geriatric dentistry is really no different than any other type of dentistry. However, when medically compromised or functionally limited elderly patients receive treatment, they are readily classified as geriatric because they present a number of potential dental treatment problems. Currently, there are no epidemiologic data available on the oral status of the geriatric population. Since most current information is presented by chronologic age, this paper will use the term elderly rather than the term geriatric. The initial focus of the paper will be on the types of physical and mental diseases affecting the population. The prevalence of these conditions is important in the continuing analysis of information on the populations of interest, the geriatric and the handicapped.

Societal Changes

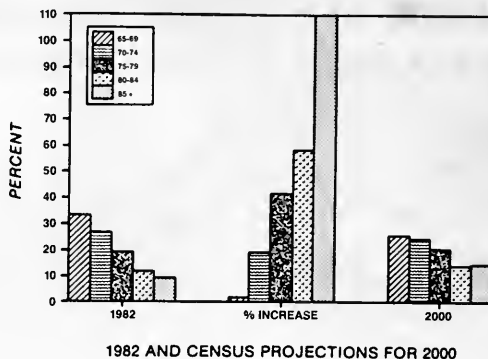
Older people historically have comprised a relatively small proportion of U.S. society. However, there has been a dramatic decrease in death rates, for the years 1925 through 1980, for the population over 55 in the United States. (National Center for Health Statistics, 1984) This decrease in death rates has led to a projected increase in the number of people over age 65 from almost 27 million in 1982 to over 35 million in the year 2000. During that time the proportion of elderly population—those age 65 and over—will increase from 11 percent to 20 percent. In addition, the age distribution within the elderly cohort also is expected to change (see Figure 1). The oldest group, 85 and over, is projected to increase 110 percent from 1982 to 2000, while the youngest group is projected for only a small increase. Thus, in the year 2000, we may expect to see not

only more elderly patients, but proportionally more of the oldest segment of the elderly population.

In the past, the elderly have been stereotyped as being primarily edentulous and in need of many prosthodontic services. More recent epidemiologic studies, which were reviewed in an earlier paper by Weintraub and Burt (1985), have shown a trend of decreasing rates of edentulism in all population age groups. Thus, the elderly can be expected to have more teeth, resulting in a wider range of oral problems needing treatment.

Elderly people also have been stereotyped as being infrequent users of dental services. Indeed, as shown in Table 1, 1963-64 national data show that people aged 65 and over were least likely to have seen a dentist, averaging .8 visits per person per year, with those visits being made by just 21 percent of

Figure 1. Distribution of People 65+ in 1982 and Projected Changes for 2000, by Age Group



Source: NCHS, "Changes in Mortality Among the Elderly," Series 3, PHS Pub. #84-106A.

Table 1. Dental Visits per Person per Year and Percent of Population with Dental Visits within Past Year

Age	1963-64*		1978-79*		1981†	
	Visits/ Person/Year	Percent of Population	Visits/ Person/Year	Percent of Population	Visits/ Person/Year	Percent of Population
Under 5	0.3	11.1	0.4	14.3	—	—
5-14	1.9	54.9	2.0	64.2	—	—
15-24	2.0	55.1	1.7	56.6	—	—
25-44	1.9	48.5	1.7	54.3	1.8	70.9
45-64	1.7	38.4	1.8	48.9	1.8	62.1
65+	0.8	20.8	1.3	34.5	1.5	42.6
All ages	1.6	42.0	1.6	50.0	1.7	63.7

*NCHS. Dental Visits. Volume and Interval Since Last Dental Visit: United States, 1978 and 1979. Series 10, No. 138, 1982.

†NCHS. Current Estimates from National Health Interview Survey, U.S. 1981, Series 10, No. 141, 1982.

—Age categories not comparable.

the elderly group. However, by 1978-79, the visit rate had increased to 1.3 visits per year, involving 33 percent of the elderly population. By 1981, the rate had increased to 1.5 visits, involving 43 percent of people aged 65 and over. These changes are especially impressive when compared to the rates for all age groups combined, which had only changed from 1.6 visits to 1.7 visits per person per year over the same time period. (National Center for Health Statistics, 1982)

Thus, dentists may expect to see not only more elderly patients, but also relatively older elderly patients who are more likely to have teeth and to make use of dentists' services. Dental practitioners may be encouraged by dental

expenditures projected for 1985 and 1990 (see Table 2). The National Center for Health Statistics (1983) projected expenditures for dentists' services to rise from \$18 billion in 1981 to \$30 billion in 1985 and to \$52 billion by 1990. However, hints of an increasing complexity of delivering those services can be found in other data in Table 2. Dramatic increases also are projected for expenditures on drugs and medical sundries and on nursing home care.

Changing Morbidity Patterns

Analyses of data from the National Health Interview Surveys from 1966 to 1976 reveal a general rise in morbidity

and disability in all age groups, with the greatest increase occurring in the 45-64 age group. (Colvez and Blanchet, 1981) More recent data from this continuing interview survey are shown in Table 3 as the number of people with various chronic conditions and the rates per thousand within four age groups. More than 16 million people have heart conditions and more than 24 million have hypertension. (National Center for Health Statistics, 1981) Prevalence rates are much higher for middle-aged adults than they are for young adults. They also are much higher for elderly people than they are for middle-aged adults. Chronic conditions with implications for dental practice are very prevalent in the population aged 65 and

Table 2. Aggregate Expenditures by Type of Expenditure: United States, 1981, and Projections for 1985 and 1990

	1981	1985	1990
Dentists' services	\$18,054	\$29,863	\$52,022
Drugs and medical sundries	20,636	29,581	44,434
Nursing home care	24,485	44,565	81,788

Amounts in millions.

Source: Changing Mortality Patterns, Health Services. Utilization and Health Care Expenditures: United States, 1978-2003. NCHS, Series 3, No. 23, 1983.

over. For example, 12 percent have arteriosclerosis, 27 percent have heart disease, and 39 percent have hypertensive disease. Thus, the prevalence of chronic systemic conditions not only has been increasing over time, but also has reached a level at which these conditions can be expected to be seen quite frequently in dental practice.

Table 4 presents 1979 rates for various types of physical impairments found in the four age groups described

above. Some type of visual impairment affects only 1 percent of those under age 17, but the rates rise with age to where 12 percent of the elderly people are visually impaired. (National Center for Health Statistics, 1981) Hearing impairments rise even more dramatically with age, with 28 percent of the elderly being hearing impaired. Deformities or orthopedic problems also rise dramatically with age, with 16 percent of the elderly being disabled. People

with physical impairments that have implications for successful treatment in the dental office are found in all age groups, but the prevalence of these impairments is especially high in the elderly population.

It would be predicted that people with chronic diseases and impairments would be more likely to be taking medications. As shown in Table 5, 1977 U.S. data show that almost 60 percent of the U.S. population was taking at least one prescription medicine. (National Center for Health Services Research, 1982) Medications were least likely to be taken by 6- to 18-year-olds and were taken most by people over age 55. Up to 75 percent of the elderly cohort was taking at least one medication. Table 5 also shows the mean number of medicines taken by people taking at least one. People who take prescription medications are likely to take more than three, with an astonishing average of 12 medications per person in the 55-64 group and 14 in the 65-and-over age group.

Prescription medicines are important in dental practice if they affect the oral

Table 3. Prevalence of Selected Chronic Conditions: Rates per 1,000, by Age and Condition, 1979

Chronic Condition	No. People (thousands)	Age			
		<17	17-44	45-64	65 +
Heart condition	16,428	17.9	37.5	128.5	274.4
Hypertensive disease	23,785	1.9	58.8	214.4	385.1
Chronic sinusitis	28,054	46.8	148.4	189.2	156.4
Arthritis	25,868	3.7	47.8	252.7	442.7
Chronic bronchitis	7,474	42.2	26.6	35.6	45.4
Diabetes	5,236	1.1	8.7	51.9	79.7
Arteriosclerosis	3,894	—	0.8	21.6	123.5

Source: NCHS. Current Estimates from The National Health Survey: United States, 1979. Series 10, No. 136, 1981.

Table 4. Prevalence of Physical Impairments, Rates per 1,000, by Age and Impairment

Impairment	No. People (thousands)	Age			
		<17	17-44	45-64	65 +
Visual	8,568	10.5	29.3	58.2	118.5
Hearing	16,663	14.4	44.9	199.2	281.6
Speech	1,968	15.9	6.2	6.5	8.4
Extremity paralysis	1,849	1.8	2.6	6.6	19.0
Deformities or orthopedic	18,364	14.2	95.2	117.9	162.1

Source: Current Estimates from The National Health Survey: United States, 1979. Series 10, No. 136, DHHS Publication No. (PHS)81-1564.

cavity or if they cause complications in the provision of dental treatment. We have taken data from the 1980 National Ambulatory Medical Care Survey (National Center for Health Statistics, 1982) on the types of medications taken and have grouped them into three broad classifications according to their potential dental implications (See Table 6). Class I includes drugs that have a direct effect on the oral cavity. Some, such as antihistamines, tricyclics, and phenothiazines have xerostomic side effects. Others, such as dilantin, have hyperplastic effects on gingival tissues. Class II includes drugs that may cause local or systemic complications for dental procedures. This class includes drugs such as coumadin and steroids. Class III includes drugs that at this time have no known predictable effect on dental treatment. National data (see Table 6) show that a substantial proportion of the drugs taken by each age group are in Class I or Class II. In the under-25 age group, approximately 66 percent of the drugs are in Class I or II. The proportion increases to 81 percent for people aged 65 and over, reflecting the great magnitude of dental implications of prescription drugs.

Table 7 presents information extracted from the Framingham Disability Study. (Jette and Branch, 1981) Included is information on the percent of people able to perform, without difficulty, selected physical activities that may have implications for either dental treatment or the maintenance of oral health.

Generally, females were less likely to be able to perform these activities without difficulty. For both sexes, the percent unable to complete the activities increased with age, with 10 to 25 percent in the 75-84 age group having disabilities.

Table 5. Percent of People with Prescribed Medicines, Mean Number of Prescription Medicines per Person with at Least One Prescribed Medicine by Age, United States, 1977

Age	Total Population	Percent with at Least 1 Prescription Medicine	Mean Number of Prescribed Medicines per Person with at Least 1 Prescribed Medicine
<6	18,216	66	4
6-18	50,647	45	4
19-24	22,299	53	5
25-54	78,472	59	7
55-64	20,180	69	12
65+	22,284	75	14
Total	212,098	58	8

Source: NCHSR. National Health Care Expenditures Study Data Preview 9, DDHS Publication No. (PHS)82-3320.

Table 6. Percent of People Taking Prescription Medication by Age and Dental Implications, United States, 1980

Dental Effect		Age			
		Under 25	25-44	45-64	65+
Prescriptions (in thousands)		181,196	143,011	169,681	160,642
Class I*	Direct	22%	31%	44%	47%
Class II†	Indirect	44%	43%	37%	34%
Class III‡	No effect	34%	24%	18%	19%

*Direct effect on oral cavity (xerostomia, tissue hyperplasia)

†Potential local or systemic complications in providing dental treatment (contraindications or precautions for certain dental procedures)

‡Currently no known predictable effect

Source: Adapted from National Ambulatory Medical Care Survey, 1980, Series B, No. 65

Table 7. Percentage of Individuals Not Able to Perform Selected Physical Activities Without Difficulty, by Age and Sex

	Extending Arms Above Shoulders		Sitting for 1+ Hours		Holding Small Objects		Lifting Weight Under 10 Lbs.	
	M	F	M	F	M	F	M	F
55-64	9%	13%	10%	17%	8%	13%	4%	12%
65-74	9	16	11	15	15	18	4	18
75-84	11	19	12	16	26	26	10	33

Source: A. M. Jette and L. Branch. The Framingham Disability Study: Physical Disability Among the Aging. *AJPH* 71(11):1211-16, 1981.

The Institutionalized Elderly

We also must consider the impact of an increasing proportion of very old people who need oral care and live in long-term care institutions. Currently, the median age of patients in nursing homes is 82 years. (U.S. Bureau of the Census, 1979) Only 5 percent of people aged 65 and older reside in institutions, but 20 percent of those over age 80 are institutionalized. (National Center for Health Statistics, 1977) If present trends continue, we can expect a larger proportion of people who are sufficiently compromised to live in institutions, yet to still need oral health services.

Tables 8 and 9 present the types of diseases and the functional status of patients the dental practitioner is likely to encounter when attempting to provide oral care services in a nursing home. Table 8 presents data on the primary diagnosis at the last exam for nursing home residents in the United States in 1977. (National Center for Health Statistics, 1977) Because this is the primary diagnosis, this table does not reflect that many patients have multiple diseases and each disease rate would be higher if all diseases that each patient had were recorded. Diseases of the circulatory system were most likely to be listed as a primary diagnosis. They occurred in almost 400 of every 1,000 nursing home residents. Of these, arteriosclerosis was the most likely subclassification. The next largest group of diagnoses was likely to be the mental disorders and senility. Chronic brain syndrome was the most frequently occurring subgroup, followed by various types of psychoses and mental retardation. Other conditions frequently listed as the primary diagnosis were diabetes, arthritis and rheumatism, and diseases of the respiratory system.

Table 9 classifies nursing home residents in the United States by their functional status. Here we have included types of functional status that may have implications for dental treatment. People with impaired vision constitute almost 29 percent of nursing home residents, and the prevalence of impaired hearing was similar. (National Center for Health Statistics, 1977) Approximately 10 percent of the residents can communicate only nonverbally, with 14 percent presenting severe communication problems. Approximately 35 percent of the institutionalized popula-

Table 8. Primary Diagnosis for Nursing Home Residents, United States, 1977

Primary Diagnosis at Last Exam	Number	Rate/1,000
Total	1,303,100	1,000
<i>Disease of Circulatory Systems</i>		
Total	516,800	397
Congestive heart failure	52,800	40
Arteriosclerosis	264,400	203
Hypertension	47,700	37
Stroke	103,500	80
Heart attack, ischemic heart disease	22,500	17
Other	25,800	20
<i>Mental Disorders and Senility without Psychosis</i>		
Total	266,100	204
Senile psychosis	21,200	16
Other psychosis	57,400	44
Chronic brain syndrome	96,400	74
Senility without psychosis	26,600	20
Mental retardation	42,400	33
Alcoholism and other mental disorders	22,100	17
<i>Other Diagnosis</i>		
Total	429,700	330
Arthritis and rheumatism	56,200	43
Parkinson's disease	23,300	17
Hip fracture	29,300	22
Other bone fracture	10,600	8
Diabetes	71,700	55
Cancer	28,900	22
Diseases of the respiratory system	31,000	23
<i>Diagnosis Unknown</i>	90,500	69

Table 9. Number and Percent Distribution of Nursing Home Residents by Selected Functional Statuses, United States, 1977

Functional Status	Number	Percent
<i>Vision Status</i>		
Not impaired	875,600	67
Partially impaired	247,000	19
Severely impaired	85,800	7
Completely lost	38,400	3
Unknown	56,300	4
<i>Hearing Status</i>		
Not impaired	906,000	70
Partially impaired	282,900	22
Severely impaired	56,300	4
Completely lost	9,300	1
Unknown	48,500	4
<i>Communication Status</i>		
Communicates verbally	1,117,000	86
Communicates nonverbally	128,200	10
Cannot talk	24,900	2
Is too ill	24,300	2
Mental or emotional problems	47,500	4
Does not speak English, other	31,500	2
Does not communicate	58,000	4
<i>Behavior Status</i>		
Depressed or withdrawn	460,000	35
Agitated, nervous, or hyperactive	440,400	34
Abusive, aggressive, or disruptive	221,500	17
Wandering	149,200	11
Other behavioral problems	114,300	9

tion are either depressed or withdrawn; another 34 percent are agitated, nervous, or hyperactive. Approximately 17 percent present problems by being abusive, aggressive, or disruptive.

The Homebound and the Handicapped

Considerable difficulty was encountered in finding any information on even the number of homebound individuals. The problem becomes more complicated if one is interested in homebound patients who may need to be treated in their residences by dentists. Information is available on the proportion of people who have restriction of activity or who are impaired in one or more activities of daily living, but this classification may not mean that the individual must be treated by a dentist in his or her home. A better indicator of how many patients may need oral care in the home may be the number who were sufficiently ill to require that a physician come to the home. Table 10 presents 1974 data on physician home visits. (National Center for Health Services, 1980) Physician home visits were made for 3 million people who constitute approximately 1.5 percent of the U.S. population. The largest number of home visits and the highest rate per thousand in the population occurred among people over age 65. The visit rate for those over 65 was 46 per 1,000, which is comparable to estimates that, while not well documented, usually classify 5 percent of the elderly population as homebound.

There are many problems in obtaining a description of the handicapped population. There is no information at all on the numbers and types of handicapped adults in the United States, although some surveys are under way. Rough estimates of the number and proportion of handicapped adults could be gained by reviewing the chronic diseases, impairments, and medications in Tables 3, 4, and 5 for people under age 65.

The term handicapped has been used synonymously with other terms such as developmentally disabled, disabled, exceptional, mentally retarded, and crippled. (Nowak, 1976) The term currently used by the federal government is "developmentally disabled." It is detailed in the Developmentally Disabled Assistance and Bill of Rights Act (Public Law No. 95-602) and defines a developmental disability functionally as a severe, chronic disability attributed to a mental and/or physical impairment that is manifested before a person reaches the age of 22. This disability affects people in the following major areas of life: self-care, learning, self-direction, economic sufficiency, receptive and expressive language, mobility, or capacity for independent living. (Kamen, 1981) Thus, a wide variety of diseases, conditions, or impairments may account for someone being developmentally disabled. While there are many different agencies that are set up to serve the developmentally disabled, the only agency charged with actually identifying the developmentally disabled is the Department of Education. One method

of estimating the prevalence of developmental disabilities is to determine the numbers of handicapped people receiving special education and related services. A total of 4.3 million received services in 1982-83, an increase of 16 percent in just six years. (U.S. Department of Education, 1984) The number of handicapped children served, in proportion to the number of children enrolled in preschool through 12th grade in 1982-83, was almost 11 percent. A breakdown of the handicapped enrollment by handicapping conditions is shown in Table 11. The conditions with greatest prevalence are learning disabled (4.4 percent), speech impaired (2.9 percent), and mentally retarded (1.9 percent). These categories, however, do not distinguish levels of functional disability either among or within categories. These rates also do not include handicapped adults or handicapped children not needing special education services. It has been estimated that as many as one million additional handicapped children are not presently being counted by the Department of Education because they do not need educational services. (Healy, 1984)

There has been a trend toward normalization or deinstitutionalization of handicapped people. They are being educated and trained for life in the community in some structured environment or with nonhandicapped individuals. This move results in an increased reliance on self-motivation to seek dental care in the private practice system. It is not known how these changes will affect oral health, since the oral status of the handicapped is influenced not only by a lack of preventive measures, but also by a lack of access to dental care. In addition to economic restraints, this lack of access to care is partly the result of a bias among practitioners against treating handicapped patients. (Kamen, 1981) (Entwistle and Casamassimo, 1981) Developmentally disabled patients often present the dental team with a complex array of psychosocial, communication, and physical problems that must be handled in the provision of dental treatment. Their problems are similar to the problems presented by the geriatric patient. Therefore, it also makes sense to classify and collect epidemiologic data on the oral status of the handicapped in terms of the seriousness of the functional disability rather than simply by

Table 10. Number and Rate per 1,000 Civilian Noninstitutionalized Population of People Who Had at Least One Physician Home Visit, by Age, United States, 1974

Age	People with at Least One Physician Home Visit	
	Number (thousands)	Rate/1,000
<15	736	14
15-44	869	10
45-64	614	14
65+	945	46
Total	3,164	15

Source: Nation's Use of Health Resources, 1979. DHEW Publication No. (PHS)80-1240. National Center for Health Statistics.

Table 11. Percent of School Enrollment Served as Handicapped, by Handicapping Condition, 1982-83

Handicapping Condition	Percent
Learning disabled	4.4
Speech impaired	2.9
Mentally retarded	1.9
Emotionally disturbed	.9
Other health impaired	.1
Multihandicapped	.2
Hard of hearing and deaf	.2
Orthopedically impaired	.1
Visually impaired	.1
Total	10.8

Source: U.S. Department of Education. Sixth Annual Report to Congress on the Implementation of Public Law 94-142: The Education for All Handicapped Children Act. Department of Education, 1984.

the disease or impairment.

To summarize at this point, it seems that the U.S. population is aging, with increasing chronic disability in all age groups and increased use of medicines that have an impact on dental disease and dental treatment beyond the disease for which they were prescribed. The increasingly older, as well as handicapped, populations are less likely to be able to perform certain physical activities, thereby impairing ability to be treated easily and to maintain oral health. The population changes that have been described may have the following implications for dentistry:

1. These special populations may have different prevalence rates for oral disease.
2. There may be different patterns of diseases in these special populations. Incidence rates may differ, rates of progression of disease may differ, and etiologic patterns may be more difficult to ascertain.
3. Common preventive procedures may be more difficult to apply within these special populations.
4. These special populations may have characteristics that affect the amount and types of dental treatment and the method by which it is performed.

Before reviewing the epidemiologic evidence on the oral status of the elderly and handicapped, a few problems inherent in interpreting prevalence data should be discussed.

Problems in Oral Status Assessment of Populations

Most dental epidemiologic studies are cross-sectional, a design that produces prevalence data. Prevalence, the measure of a disease or condition at a single point in time, traditionally has been used to describe the amount of disease present and to identify characteristics of people who have and do not have disease. When the diseases of interest were infectious and acute in nature, the knowledge of who had and who did not have the disease led to clues to the etiology of that disease. This occurred because prevalence and incidence of disease are very similar when cases of a disease do not exist in the community for long periods of time. Incidence data are needed to accurately determine causality. However, when the diseases are chronic, as are most dental diseases, there is an accumulation of cases that build up, and prevalence information becomes very different from incidence information. Thus, in prevalence studies of dental diseases, we are often associating the presence or absence of dental conditions that could have occurred over a great number of years in a person's life with characteristics of the person at the time at which the study was conducted. Quite often we find that characteristics of a long-standing nature, such as a person's educational level, marital status, or age, are most

likely to be associated with the dental conditions. Theoretically important variables such as spendable income, attitudes toward oral health, and attitudes toward dental treatment are quite often found to be weakly associated. Consequently, when studying the elderly and adult handicapped, we might expect that prevalence studies will do little more than tell us the number of dental conditions in the community. Analysis of this information will be further complicated by several other epidemiologic factors that affect our ability to accurately predict the future impact of these oral conditions on society. These factors include cohort effects, selective survival, tooth loss, and changes in treatment patterns. Each of those factors is discussed very briefly.

A cohort is a group of people having similar characteristics. The picture of a population that is taken by a prevalence survey is complex because it always includes a multitude of different cohorts. Usually, the characteristic of greatest interest is age. Thus, a prevalence survey will contain people ranging in age from infancy to very old, who are usually grouped in several age categories. Oral conditions are then usually presented by what appears to be a progression in age. In fact, these are distinct cohorts of people who have had different life experiences (including experiences with dentistry) and who may or may not be similar to older or younger cohorts. For example, there has always been a great temptation to indicate that the seriousness of periodontal conditions increases with age. Gingivitis may predominate in a younger age group, moderate pocketing may predominate in a middle-age group, and severe pocketing and tooth loss may be higher in an older group. However these are different cohorts of people and it is not known whether the disease actually does progress as a cohort ages or whether the older cohorts have had moderate or severe pocketing for much of their lives.

With some oral conditions, differences found in different age cohorts also may reflect changes in treatment patterns. Perhaps the most obvious example is edentulousness, which is decreasing in the United States. (Weintraub and Burt, 1985) However, in a sample of edentulous individuals, it was found that there was a definite household effect, with one spouse being

2.8 times more likely to be edentulous if the other spouse was edentulous. (Hunt and Beck, 1984) This similarity between spouses is due, at least in part, to shared factors such as use of the same dentist, similar dental utilization patterns, similar attitudes and values, and changes in treatment patterns over time. Thus, one cannot rule out the effects of treatment patterns on the prevalence of dental conditions in the population.

The concept of selective survival and the fact of tooth loss are two factors especially relevant in the study of adult populations. Since prevalence data only measure what is there at one time, the investigator can only measure disease in older people who have survived to a certain age and have kept some of their teeth. Thus in any survey of elderly people, the measurement may simply be of the healthy survivors who may have disease patterns and risk factors different from those who lost their teeth at an earlier age. Beyond that, selective survival may be tooth-type specific in that certain teeth may be less susceptible to dental diseases. In elderly populations, the characteristics of people who have dental disease in certain teeth may be different from those who have disease in more susceptible teeth. Finally, the fact that the teeth are lost makes it difficult to determine why they were lost. Since longitudinal studies are expensive, an alternative is to examine the same people in a population study at two well-separated times, such as 10 to 20 years apart. With adults, it is still difficult to determine the incidence of any condition except edentulousness, unless one keeps track of the reasons for which teeth were lost over that time period.

The problems enumerated above are not detailed in order to conclude that we cannot know anything about the oral conditions of elderly and handicapped people. Yet they do indicate that epidemiologic studies on adults are extremely complicated and that it is difficult to be confident of what we know about oral health. It is important to keep these factors in mind when reviewing studies of oral conditions in these special populations. We approach this task, remembering the advice of Brody, who in reviewing epidemiologic data on aging, states, "One hazard is an overstatement of knowledge in areas where scientific evidence is weak or lacking." (Brody, 1984)

Oral Health Status of the Geriatric Population

Laboratory and clinical research on aging has demonstrated that aging and disease are different, but the dental research community has lagged behind some disciplines in studying aging and the elderly. (Baum, 1981) This lack of research has resulted in a number of stereotypes and generalizations that have been repeated so often they are presented as fact in geriatric texts and papers. (Langer, 1976) (Nizel, 1976) (Shklar, 1979) (Storer, 1978) (MacHudis, 1983) (Franks and Hedegard, 1973) Included are such generalizations as decreased salivary flow, altered taste and smell, atrophy of oral mucosa, atrophy of orofacial musculature, high rates of edentulism, and high rates of root caries and advanced periodontal disease in the remaining teeth.

The true nature and extent of oral physiologic and oral pathologic changes are poorly defined. Available epidemiologic data on the prevalence and incidence of oral disease in the elderly population are limited. There have been only two national surveys that are helpful in indicating the prevalence of oral conditions in the elderly population, and these data are becoming somewhat dated. In addition, the oldest age cohort was not represented in these national samples. The National Health Examination Survey (NHES) (National Center for Health Statistics, 1967) of 1960-62 included no participants over age 79. The National Health and Nutrition Examination Survey (NHANES) of 1971-74 included no subjects over age 74. (National Center for Health Statistics, 1981) Any other data from the United States that are available have been collected on small populations at high risk for dental disease, on small populations of institutionalized people, or on a limited number of elderly people participating in a survey of all age groups. Some data are available on populations in other countries, such as Great Britain and Scandinavia, but the dental health and dental care patterns are much different from those found in the United States.

The National Institute for Dental Research recently has awarded a contract to again investigate oral conditions in a nationwide sample of working adults. A sample of elderly people who attend multipurpose senior citizen

centers are to be included in this cross-sectional survey. Useful information will be obtained from the elderly sample, but the participants will not be entirely representative of the nation's elderly population. At the University of Iowa, we are presently undertaking a longitudinal survey of the prevalence and incidence of oral conditions in a representative sample of noninstitutionalized rural elderly Iowans. Some baseline prevalence data from this survey are included later in this paper.

Aside from these studies, there have been no recent, representative, population-based studies of oral conditions in the elderly in this country. In addition, clinical research investigating age-associated oral changes is limited, while controlled clinical trials and planned preventive interventions to improve oral health typically do not include elderly participants.

Age-Associated Oral Changes

Mucosal Atrophy

The generalizations usually made about oral structural and functional changes associated with aging apparently are based on clinical impressions or studies of small groups of high-risk, medically compromised people. It is important clinically to recognize that morphologic changes and physiologic changes often associated with aging are instead caused by underlying pathologic conditions, rather than by aging per se. Baum (1981) has reviewed studies of oral mucosal changes and found that no conclusions could be drawn about whether there is atrophy of the oral mucosa in aged people. Data were scarce and subjects were poorly described. Two studies that used adequately described subjects and similar study methods had conflicting results. (Brown and Young, 1970) (Mosadomi et al., 1978) All other studies reviewed were weakened by lack of adequately described subjects, lack of representative subjects, and lack of standard criteria to assess mucosal atrophy. Feldman and Chauncey (1984) concluded that specific alterations of the oral tissues may not be the result of aging itself, but may instead be induced by a host of environmental factors, such as tobacco smoking.

Further investigation of age-associated mucosal atrophy would be

strengthened by the study of clinically healthy adults of all ages, as well as adults with varying dentition states. These adults need to be fully described, especially in terms of medical history, so the confounding effects on mucosal structure of factors such as systemic conditions and medications can be assessed. There is also a need for standard, reproducible methods of assessing mucosal atrophy in clinical research. Assessment on an epidemiologic basis cannot be made until easily applied survey criteria have been developed.

Muscle Function

The orofacial musculature also is believed to atrophy with age. Changes in muscle function are a dental concern, particularly for edentulous people in terms of denture adaptation and efficiency. However, conclusions cannot be drawn from existing research. Most studies include only elderly edentulous people, thereby preventing comparison of muscle function between people with different dentition states and between different age cohorts. A recent Veterans Administration Longitudinal Study investigation found that masticatory ability was unchanged with age. (Feldman et al., 1980) However, older subjects required more time to chew food in preparation for swallowing. A recent investigation in the Baltimore Longitudinal Study of Aging used physical oral-motor examinations to assess oral function. (Baum and Bodner, 1983) Age was associated with lip posture impairment, but not with impairment of swallowing. Clearly, data on oral musculature change are scarce. Research in oral musculature atrophy suffers from the same weaknesses as does research in mucosal atrophy. There remains a lack of adequate, objective, and reproducible methods of assessing oral-motor function. Future studies must include well-described and carefully selected subjects representing a variety of ages and dentition states.

Taste

The association between age and diminished quality of gustatory or taste function has been investigated in many studies, with equivocal results. Grzegorzczuk and co-workers (1979), in a review of studies of taste function, identified such methodological problems and concerns as lack of water rinses

before tasting solutions, inadequate exposure to the taste system, inadequate range of concentrations of tastants in solutions used, and use of minimum taste thresholds. The use of minimum taste thresholds to assess taste function has been criticized as too unlike the real life situation. Bartoshuk (1978) instead recommended the use of suprathreshold concentrations. When these threshold concentrations have been used in tests, mild increases in sodium chloride thresholds have been found with age. (Baum, 1981) (Grzegorzczuk et al., 1979) Similar differences with age have been noted for quinine sulfate (bitter) thresholds, but not for citric acid (sour) or sucrose (sweet) thresholds. (Baum, 1981) Thus, clinical research in gustatory changes in the elderly has not found evidence for any broad generalizations about loss of taste function as a person ages.

Salivary Function

Studies of salivary function in elderly subjects generally have agreed on a conclusion of age-related morphologic salivary gland changes, but have not agreed on the functional consequences of these changes. (Baum, 1981) Comparability of results has suffered from methodological issues such as poorly described subjects, nonrepresentative subjects, and lack of standardized methods of salivary stimulation and salivary collection. In addition, it is now recognized that salivary function is affected by confounding factors such as regulation of collection times, postprandial times, and menstrual status. (Baum, 1981) (Mandel and Wotman, 1976) Recent evidence indicates that a diminished salivary flow often noted in studies of the elderly is due to pathologic conditions or pharmacologic effects of medications, rather than aging per se. (Baum, 1981) Examinations of specific salivary constituents have been plagued by similar methodologic problems. Baum (1981) has concluded that sufficient advances have been made in salivary gland physiology to adequately examine salivary gland function in aging, but rigid criteria for saliva collection and standard methods of analysis need to be applied. Additional research in salivary function, particularly age-associated changes in function, is needed, but the many methodologic problems just described must be addressed and overcome.

Oral physiologic functions have im-

portant clinical implications for geriatric dentistry. Included in the implications are concerns such as ability to tolerate or accept removable prostheses, the ability to tolerate or enjoy a number of different foods, and the ability to protect the teeth and other oral structures from an altered ecology of microflora.

Summary

Age-associated changes in mucosal structure, oral musculature function, taste perception, and salivary function have been studied to a varying extent with generally inconclusive results. Definitive results can only come from improved study methods. In particular, subjects need to be selected carefully and described fully not only in terms of demographic characteristics, but also in terms of medical histories. Standardized methods of data collection must be used so that valid comparisons can be made between age cohorts, and between healthy individuals and those with systemic conditions. Evidence indicates that some conditions commonly thought to be part of physiologic aging are really a result of pathologic processes and only indirectly associated with aging.

Edentulism and Tooth Loss

Edentulism rates among the elderly have been reported as relatively high in a number of European countries and Australia, ranging from 57 to 85 percent being edentulous (Smith, 1979) (Clarkson and O'Mullane, 1983) (Swallow et al., 1978) (Ainamo, 1983) (Rise, 1982) (Spratley, 1978) Edentulism has been shown consistently to increase with age, with females having higher rates of edentulism than males. Limited data indicate that rates are lower in the United States. Data are available from the two national health examination surveys and from recent statewide surveys in North Carolina and Iowa. Some additional data come from the ongoing series of annual national health interview surveys, but these interviews typically obtain little information about dental health.

Edentulism rates from two national interview surveys (National Center for Health Statistics, 1974) and the two examination surveys (National Center for Health Statistics, 1967 and 1981) are shown in Table 12. Data indicate a trend of decreasing edentulousness over time. Elderly females have had con-

Table 12. Percent Edentulous in U.S. Elderly Population: Two Interview and Two Examination Surveys

	HIS* 1957-58	NHES† 1960-62	HIS 1971	NHANES 1971-74‡	
				Whites	Blacks
Males, 65-74	52.8%	45.1%	45.0%	43.6%	27.9%
Females, 65-74	57.6	53.0	45.4	47.0	53.0
Males, 75 +	62.4	55.7†	56.3	‡	
Females, 75 +	71.0	65.6†	62.2	‡	

*HIS—Health Interview Survey^{48,49}; national samples, all ages

†NHES—National Health Examination Survey⁵¹; people aged 80 + not examined

‡NHANES—National Health and Nutrition Examination Survey⁵²; people aged 75 + not examined

sistently higher rates than elderly males, but the differences in sex-specific rates may be decreasing. For example, in the 1971 HIS survey, there was only a .4 percent difference in the edentulism rates for males and females in the 65-74-year-old age cohort. (National Center for Health Statistics, 1974) The decline in sex-specific differences appears to be accounted for mostly by whites. In the 1971-74 NHANES survey, black women aged 65-74 were much more likely to be edentulous (53 percent) than were black males aged 65-74 (28 percent). (National Center for Health Statistics, 1981)

More recently, oral health surveys have been completed in two states. In Iowa, 34 percent of people aged 65-74 were edentulous, while 44 percent of those aged 75 or over were edentulous. (Ettinger et al., 1984) In North Carolina, 40 percent of people aged 60-70 were edentulous, but the rate jumped to 62 percent for people aged 70 or more. (Schonfeld and Warren-Hicks, 1981)

Another recent survey in Iowa included an interview of 3,673 noninstitutionalized people age 65 and over in two predominantly rural counties. Edentulism rates decreased from 53 percent in the age 80 and over cohort to only 29 percent in the 65-69 age cohort. (Hunt et al., 1985) There were essentially no differences between males and females in any of the age cohorts.

Summary

Data from these surveys indicate that sex-specific differences in edentulous may be disappearing, while racial differences may be persisting. Rates are consistently higher in older age groups, but the differences are probably declin-

ing, especially among whites. Much of the difference in age-specific rates is due to cohort effects in cross-sectional prevalence surveys. Younger people have had more exposure to a more preventive-oriented dental health philosophy and improved methods of maintaining previously diseased teeth. Thus, tooth loss may not be so much a function of increased age as it may be a function of different lifetime experiences and changing dental care practices.

Coronal Caries

Baum (1981) has argued that dental caries usually is not perceived as a problem for the elderly because the group is typically stereotyped as substantially or fully edentulous. Indeed, DMF data from the two national examination surveys show comparable decay or D rates of only .5-.7 teeth per dentate person in the 65- to 69-year-old cohort in both surveys. In addition, the loss of teeth was very high. (National Center for Health Statistics, 1967; 1981) No other age-related conclusions about coronal caries could be drawn from those surveys because of the age restrictions included in the sampling frames. Interestingly, Chauncey et al. (1978) have pointed out that if coronal caries prevalence is considered in proportion to the number of teeth present, older adults may have higher attack rates than do younger adults.

Since there have been no recent national caries studies on adults, evidence about coronal caries patterns in the elderly must be taken from the regional population surveys and special population surveys. North Carolina data indicated that decay (D) rates were higher in some adult groups than they were in children. (Hughes et al., 1982) Iowa data on restorative treatment needs also indicated rates higher in

some adults than in children (Beck et al., 1982) Iowa data also showed that a substantial portion of the decay occurred on surfaces already filled. In some cases, there were new lesions on a different part of the same surface, but most were recurrent or secondary lesions. More recently, in a survey of rural elderly people in Iowa, we found that 30 percent of 520 dentate subjects had untreated coronal decay. (Beck, 1985) Those having decay had about three decayed teeth per person. Approximately half the lesions were due to recurrent caries.

The prevalence of coronal caries has been determined in a number of populations not representative of the U.S. population. (Chauncey et al., 1978) (Banting et al., 1980) (Smith and Sheiham, 1979) (Leake and Martinello, 1972) (Grabowski and Bertram, 1975) In general, the decay rates are equal to or greater than those found in our survey of elderly Iowans. Definitive conclusions cannot be drawn, however, because of differences in data collection methods, different population edentulism rates, different reporting methods, and the use of nonrepresentative samples.

Summary

It is difficult to draw definitive conclusions about coronal caries in the elderly, but data tend to indicate that initial and recurrent coronal caries are significant problems for this age cohort. Additional standardized studies of representative samples of elderly are needed to better describe both the prevalence and the incidence of coronal caries. To date, most studies have been limited to prevalence assessment and may include analysis of relationships between caries rates and some demographic characteristics. Additional data

also are needed for analysis of potential risk factors for this disease. Also needed are assessments of the roles of such factors as systemic conditions and medications, fluoride histories, dental care utilization patterns, and behavioral and attitudinal characteristics. Prospective studies should be conducted.

Root Surface Caries

The epidemiology of root surface caries in the elderly, or any age group, is less well described than that of coronal caries. The NHES, NHANES, North Carolina, and Iowa population studies did not distinguish between coronal surface caries and root surface caries. Most studies that did identify root caries rates in selected populations included few or no subjects aged 65 and over. (Hazen et al., 1974) (Sumney et al., 1973) (Lohse et al., 1977) (Hecht and Friedman, 1949) (Hix and O'Leary, 1976) (Raval and Hamp, 1981) (Katz et al., 1982) (Stamm and Banting, 1980) However, prevalence rates, defined as the percent of the population with root caries, generally have been found to increase with age.

Banting and co-workers (1980) examined 59 institutionalized elderly in Ontario and found a mean of 7.6 decayed and 2.2 restored root lesions. In a recent study of a sample representing the adult population of Finland, the proportion of people with root caries and the proportion of teeth affected increased with age (Vehkalahati et al., 1983). Among subjects aged 70 and above, 27 percent of the females and 32 percent of the males had root caries. They had 5.2 and 6.0 teeth, respectively, affected by root caries. In our survey of noninstitutionalized elderly, we found much lower root caries rates. (Beck et al., 1985) Overall, 63 percent of the elderly subjects had some decayed or filled root surfaces, but all the untreated lesions occurred in just 25 percent of the subjects. Those with some decayed or filled root surfaces had an average of 3.6 surfaces affected. The rates were essentially the same for males and females, but the females were more likely to have the lesions treated. Most lesions were initial lesions, rather than recurrent.

Summary

As with coronal caries, the epidemiology of root caries is poorly described. Additional studies, using

standardized assessment methods, are needed to quantify the prevalence and incidence of root caries in representative populations. No national data are available, and recent smaller studies indicate that there is evidence of root caries attack in more than half the elderly population. However, unfilled lesions occur in only 25 percent of the group. Additional data and analyses are needed to investigate factors associated with increased risk for root caries in both the well elderly and the compromised elderly. At this time, it is not known who is likely to have caries problems, nor is it known whether planned interventions for caries reductions are needed for any elderly populations. Prospective studies are needed to eliminate the problem of selective survival of teeth, to identify groups at high caries risk, to investigate possible etiologic factors, and to test preventive agents.

Periodontal Diseases

Many studies have investigated the prevalence of periodontal diseases in populations of all ages. However, periodontal disease is a condition that has been difficult to define and difficult to assess. A large variety of epidemiologic indices have been used in attempts to quantify periodontal conditions, with no consensus yet about which indices should be used.

While some indexes, like the Gingival Index of Loe and Silness (1963), quantify only gingival inflammation, most periodontal indexes attempt to categorize each case along some continuum ranging from healthy to gingival inflammation to moderate pocket formation to severe periodontal destruction. The most commonly used indexes of periodontal disease levels have been Russell's PI (1956) and Ramfjord's PDI (1959). Both indexes classify cases on a disease continuum, but the indexes are not readily comparable. Thus, direct comparisons of data from surveys using these different indexes are quite difficult.

The prevalence of periodontal disease in any age cohort is difficult to assess because of a lack of definition of periodontal disease. Most studies report a very high prevalence rate for periodontal disease if gingivitis is considered a periodontal disease. If periodontal disease is defined as the presence of moderate or severe bone

loss and periodontal pocketing, the prevalence rates are much lower. Questions have been raised about the sensitivity of and ability to standardize examiners on indexes that include subjective evaluation of gingival inflammation. (Hunt and Beck, 1984) (World Health Organization, 1978) Thus, increasing attention has been placed on assessing periodontal treatment needs in broad classifications, rather than trying to differentiate more narrowly defined disease levels. The commonly employed indexes of treatment needs are the Periodontal Treatment Needs System (PTNS) (Bellini and Gjermo, 1973) and the Community Periodontal Index of Treatment Needs (CPITN). (Ainamo et al., 1982) They classify teeth and subjects by presence or absence of gingival inflammation, presence or absence of calculus deposits, moderate pocketing (up to 6mm), and severe pocketing (over 6mm).

Periodontal disease prevalence assessment in the elderly population is especially difficult. In addition to questions of what periodontal disease is and how it should be measured, there is the previously described lack of population-based studies of elderly people. Surveys of representative populations in other countries indicate increased prevalence of advanced periodontal conditions with age. Finnish data show that 44 percent of people aged 70 and over had periodontal pockets 4-6mm and 31 percent had pockets over 6mm. (Markkamen et al., 1983) Dutch data indicate that among dentate working adults, the prevalence of periodontal pockets increased with age. (Plasschaert et al., 1978) Among people aged 55 and over, 82 percent had pockets of 3mm or more, with about three teeth affected per person. In a Swedish study, 79 percent of dentate subjects had periodontal pockets of 4mm or more, with 14 percent of tooth surfaces being affected. (Hugoson and Koch, 1979) However, among people aged 60 and over, only 6-8 percent had severe periodontal disease. (Hugoson and Jordan, 1982)

Limited data from this country indicate that prevalence of advanced periodontal conditions may be lower. North Carolina data indicate that the percent of adults with periodontitis increases with age, up to 30 percent for whites over age 70, slightly higher for nonwhite females, and extremely high for nonwhite males (over 85 percent).

(Hughes et al., 1982) The higher rates for nonwhites may be due to differences in dental care patterns rather than disease per se. Nonwhites tend to have fewer visits and tend to retain more teeth, but a number of these teeth may be severely diseased. Iowa data, from a statewide survey of all age groups, indicate that approximately 32 percent of the elderly population has 3-6mm pockets, but only 2 percent need extensive periodontal treatment for pockets over 6mm. (Beck et al., 1984) These data did not indicate an increase in prevalence with age for age groups over 44 years.

Our recent survey of 520 dentate elderly Iowans found that 53 percent had periodontal pockets 3-6mm, but only 13 percent had pockets over 6mm, and 7 percent had teeth sufficiently mobile to be indicated for extraction. (Hunt et al., 1985) This elderly dentate cohort had a mean of 6.1 teeth with 3-6mm pockets, but only .4 and .2 teeth with pockets over 6mm and excessive mobility, respectively. In addition, there was not a significant increase in teeth affected, by age group from 65-69 to 80 and over.

Summary

At best, the epidemiology of periodontal diseases in the elderly is confused. Indeed, Page and Schroeder (1982) have argued that gingival disease and periodontal disease are two separate and distinct entities. If periodontal disease is defined as moderate pocketing, then the prevalence in elderly groups may be relatively high. However, if periodontal disease is defined as advanced pocketing and destruction, then the prevalence may be quite low. However, data are too scarce to draw any definite conclusions for policy purposes. Questions remain about what conditions need to be treated, what conditions will result in tooth loss, and what cases are active rather than passive. (Beck, 1984) There are methodologic problems that must be resolved in how to quantify periodontal conditions reliably. Incidence data are needed to assess the long-range outcome of gingivitis, periodontal pocketing, and loss of attachment. Incidence data also are needed to identify risk factors for periodontal disease and to determine if those risk factors are different in the geriatric population. Controlled clinical trials are

needed to assess the efficacy of antimicrobial rinses, oral hygiene regimens, and behavioral changes in decreasing periodontal destruction.

Oral Cancer

Smith (1979; 1982) has completed two reviews on the epidemiology of oral and pharyngeal cancers. Since incidence data are generally lacking, relative frequency is often used to assess risk for oral cancer. In North America and Western Europe the relative frequency of oral cancer is 2-5 percent. In other countries, the frequency is generally much higher. The estimated annual incidence of oral cancer is about 4 percent for males and 2 percent for females. (Silverberg, 1983) The relative frequency and estimated incidence rate for oral cancer increases with age (Cutler and Young, 1975) (Hill and Rowe, 1982) (Axtell et al., 1976) Additional risk factors already identified include alcohol and tobacco use. (Graham et al., 1977) (Williams and Horm, 1977)

For diseases with low incidence, it is particularly hard to determine incidence rates reliably. Similarly, it is difficult to investigate potential risk factors. Existing prevalence data indicate that older people are more likely to have oral cancer. If incidence rates are not decreasing, then as the population ages, oral cancer may become a more significant problem. There is a need for studies of additional psychosocial and behavioral characteristics that may be associated with oral cancer. Without identification of risk factors, there cannot be identification of high-risk patients or early diagnosis and treatment of the disease.

Denture Problems and Lesions

It is estimated that approximately one-third to one-half of this country's elderly population is completely edentulous in both the maxillary and mandibular arches. (National Center for Health Statistics, 1974) (Hunt et al., 1985) Another 10-20 percent is edentulous in just one arch. Over 95 percent of these people have complete dentures that they wear at least part of the time. In addition, 15-20 percent wear removable partial dentures. Thus, there is a great potential for denture-type dental problems and denture-related mucosal lesions.

National data on denture problems

are very limited. The national examination surveys and the North Carolina survey included little prosthodontic information. Sheppard and co-workers (1971) examined more than 3,500 edentulous outpatients in 1971 and found patient satisfaction with 85 percent of the maxillary dentures and 74 percent of the mandibular dentures. However, dental examiners found denture-related mucosal lesions in 46 percent of the denture wearers. A substantial proportion (29 percent) of the subjects had seen a dentist in the past year, but 35 percent had not seen a dentist for five years or more. This study did not identify any age-associated trends.

In the Iowa statewide survey, elderly subjects were more likely to be edentulous and to be wearing dentures. (Ettinger et al., 1984) In addition, a greater proportion of the elderly subjects (18 percent) needed a denture relined or remade. About 32 percent of the denture wearers had denture-related mucosal lesions.

In the Iowa elderly survey, 38 percent of subjects aged 65 and over were completely edentulous, while 13 percent were edentulous in one arch. (Hunt et al., 1985) Over 32 percent of complete denture wearers and 14 percent of partial denture wearers had denture-related lesions. (Hand and Whitehill, 1985) Factors associated with the prevalence of denture lesions were less than high school education, time since last dental visit, tobacco use, and alcohol use. The subjects reported few problems with their dentures, even though 70 percent of the edentulous subjects had not seen a dentist in five years. However, dental examiners found relatively high rates of prosthodontic treatment needs, with 6 percent needing new dentures, 12 percent needing a relined, and 4 percent needing repair or adjustment.

Summary

The limited data available indicate that denture problems and denture-related lesions constitute a large problem for the elderly population. However, additional studies of representative groups are needed to assess more reliably and validly these problems. Also, incidence studies are needed to identify risk factors, especially behavioral and attitudinal ones. Methods of educating and encouraging denture wearers to continue seeking

dental care also are needed. There have been substantial amounts of unmet prosthodontic treatment needs in the populations that were studied.

Cervical Abrasion

Abrasion, which usually occurs in the cervical portion of buccal tooth surfaces, is the pathologic wearing of hard dental tissue by the friction of a foreign body independent of occlusal forces. Measures of abrasion usually are not included in epidemiologic surveys, but it has been estimated to affect 30 percent of a Swedish population.

(Bergstrom and Lavstedt, 1979) In the Iowa survey of the elderly, about half the subjects had unfilled abrasion less than 1mm in depth, while about 30 percent had untreated abrasion over 1mm in depth. The subjects had a median of three teeth with shallow abrasion and two teeth with deep abrasion. (Beck et al., 1985)

The prevalence of abrasion in adult populations generally is undefined. Additional prevalence and incidence studies are needed to assess the magnitude of this problem, determine associations with other dental problems, and investigate risk factors for the condition. At present, the epidemiologic indices used to measure these conditions are crude and require additional research to improve reliability and validity.

Occlusal Attrition

Attrition, which is the loss of occlusal and incisal hard tooth structure due to occlusal force and friction, is essentially undescribed in representative populations. The most frequent methods for recording attrition have been based on the degree of dentin exposure. (Akpata, 1975) Attrition is believed to be associated with age, but little else is known about the condition.

In the Iowa elderly survey, 73 percent of the elderly subjects had attrition in which all the occlusal or incisal enamel was lost, with about 5 teeth being affected. (Beck et al., 1985) In addition, about 4 percent of the subjects had severe attrition to the gingival margin, with about 2 teeth being affected.

Oral Status of Institutionalized Elderly and Handicapped

Oral Status of the Institutionalized Elderly

This review of the elderly's oral health status has focused mainly on the noninstitutionalized segment of the population. General perceptions are that the oral health of the institutionalized elderly is worse than that of their peers who live at home in the community since the institutionalized tend to be older, have more physical and mental disabilities, and have more chronic diseases. (Banting et al., 1980) (Manderson and Ettinger, 1975)

National data on the oral status of institutionalized elderly are minimal. Only denture information is available from the National Nursing Home Survey conducted in 1977. (National Center for Health Statistics, 1977) It was found that 53 percent of nursing home residents had dentures and used them, while 5 percent had dentures but did not use them. There was an age effect for people who had dentures and used them that ran from 22 percent of those under age 65 to 63 percent of people aged 85 and over. Thus, edentulism rates from 1977 were relatively high. The only information on other oral conditions are from studies usually including residents in either a single or several nursing homes. Most of these studies indicate that dental caries rates are high and that oral hygiene is poor in these groups. The authors have 1984 data on treatment needs of over 1,300 residents of nursing homes in Iowa.

The mean age of these residents was 83.5 years. All of these residents were screened, and were found to have dental needs. However, it was found that only 65 percent of the residents could benefit from dental treatment. When treatment was recommended, a prophylaxis was recommended for 47 percent of the residents, restorative treatment for 40 percent, prosthodontic treatment for 51 percent, minor oral surgery for 27 percent, and periodontal treatment for 16 percent of the residents. Thus, if Iowa nursing homes are at all representative of nursing homes across the country, more than 50 percent of the residents could benefit from dental treatment. That treatment includes a wide variety of dental needs

in a group who have multiple systemic diseases and impaired functional status.

We were unable to find any national or regional information on the oral needs of the homebound. These people are estimated to represent approximately 5 percent of those individuals over age 65.

Summary

The only information available on the national level regarding the oral status of institutionalized and homebound elderly is that of denture status of the institutionalized. Generally, it is found that their edentulism rate is relatively high and their oral status is poor. If teeth are remaining, they tend to suffer from the person's inability to maintain even minimal hygiene and from a lack of access to dental treatment. Over half of the residents might benefit from some type of dental treatment. However, if treatment is available either by transporting the patient to a dental office or by using mobile or portable equipment at the place of residence, treatment is frequently very difficult to perform, and the prognosis for long-range success is often more guarded than it is for the healthier elderly.

Oral Health Status of the Handicapped

A developmental disability is a condition or disease that interferes with the ability to develop the physical and mental capabilities required to achieve academic, social, and functional parity with one's age cohort. (Healey, 1977) The term developmental disability can define certain conditions or can classify functional disabilities or handicaps.

Administrative requirements of funding agencies frequently require categorization of developmental disabilities by diagnostic labels such as mental retardation, cerebral palsy, epilepsy, autism, and dyslexia. Similar labels and categorizations typically have been used when assessing the oral health status of handicapped people. Surveys of handicapped populations have been reviewed by Brown and Schoedel (1976), Tesini (1981), and Nowak (1976). These reviews indicate there is general agreement that the handicapped population has higher rates than the nonhandicapped population for poor oral hygiene, gingivitis, and periodontitis. Moderate or severe gingivitis has been found almost univer-

sally, with degree and extent increasing with age and degree of mental retardation (Tesini et al., 1976) and mongolism. (Cohen and Winer, 1975) When mongoloid patients were compared with cerebral palsy patients, the mongoloid patients had significantly more severe periodontal breakdown, with mean PI = 3.1 vs. 1.7. (Sznajder et al., 1968) (Sznajder and Fenick, 1967) Local factors such as macroglossia, malocclusion, tooth morphology, lack of normal masticatory function, and bruxism have been suggested as reasons for higher rates of periodontal disease. (Johnson and Young, 1963) Cutress (1971), however, identified a trisomic systemic factor that increases disease susceptibility by combining with factors such as poor circulation, neurodystrophy, early physical deterioration, and other genetic influences.

There is considerably less agreement about caries rates among handicapped people. Among the many studies reviewed by Nowak (1976) and Tesini (1981), some reported less caries in handicapped than in nonhandicapped. Others found no differences between these groups, and some found higher rates in the handicapped population. These studies used a wide variety of study populations, differing methods of data collection and analysis, and most are now somewhat dated.

Even among the more recent studies, the lack of agreement on caries patterns has continued. Swallow (1972) compared educationally subnormal children with educationally normal children and found no differences in caries rates. Sandler and co-workers (1975) compared mentally retarded inpatients and outpatients, finding that outpatients had higher caries rates only in some age groups. They further concluded that oral hygiene was not a factor in caries rates in these patients. Svaton and Heloe (1975) compared institutionalized and noninstitutionalized mentally retarded children and adults and found that the institutionalized cohort had lower caries rates in both the primary and permanent dentitions. Their results parallel those of Tesini (1980) who also found the magnitude of difference between the cohorts increased with degree of retardation. He concluded that the degree of mental retardation and institutional status must be considered when assessing caries rates.

The general lack of agreement among studies of caries prevalence may be

evidence that the categorization of developmental disabilities by diagnostic label, e.g., mental retardation, may be inappropriate. Healy (1977) has described another method of classifying developmental disabilities, by categories of functional impairment. Project Head Start developed diagnostic criteria for 10 categories of impairment: blindness, visual impairment, deafness, hearing impairment, physical handicap, speech impairment, health impairment, mental retardation, serious emotional disturbance, and specific learning disabilities. Included in the health impairment criteria are severe dental caries, periodontal disease, or structural malformations that interfere with adequate mastication.

In assessing the oral health status of the handicapped population, it may be more important to consider functional ability and disability, rather than a medical diagnosis. Evidence from the work of Tesini (1981) indicates that it is not the disease per se that influences dental disease rates but the level of profoundness of the disease. The disease level then affects the level of functional ability to accept dental treatment and to use preventive measures such as regular oral hygiene and self-applied fluoride.

Another factor with considerable impact on dental disease levels was identified by Cutress (1971) as the number of erupted teeth. He compared trisomic 21 mongoloid patients with mentally retarded patients. Some of each group lived at home and some lived in institutions. Observed differences between trisomic and mentally retarded subjects living in the same environment was explained in terms of delayed tooth eruption and fewer number of teeth present, rather than environmental or inherent factors arising from chromosomal abnormalities.

Summary

Data indicate that moderate and severe gingivitis is very prevalent in the handicapped population. The prevalence of periodontal breakdown is probably higher than in nonhandicapped people of the same age, but these findings are not well documented. Dental caries rates do not appear to be substantially different from those found in the nonhandicapped, noninstitutionalized population. For some conditions, like mongolism, caries rates appear to be lower, but this may be due

primarily to delayed tooth eruption.

Additional information is needed about how disability levels affect disease levels. Little is known about whether severity of handicap is related to dental disease. Information also is needed on how preventive regimens can be implemented and whether they are effective in improving oral health in the handicapped. These preventive regimens could be community-based, either home or institution, and could include oral hygiene, self-applied fluorides, and antimicrobial mouthrinses. Additional regimens could be clinic-based and could include regular examinations, prophylaxis, topical fluoride, and sealants.

Conclusions

Given the problems in definition, study design, data interpretation, and study comparison described in this paper, it may seem pretentious to have a section labeled conclusions, especially if the section emphasized what is known about oral health problems of the geriatric and the handicapped. Indeed, most of our conclusions will tend to underscore what is not known at this time.

It seems relatively safe to conclude that the number of elderly people will be increasing over the next 30-40 years. Not only will the elderly be increasing in number, but the proportion of very old people will also be increasing. Given no social or policy changes in regard to nursing home care, larger numbers of the older members of our society can be expected to reside in long-term care institutions.

There has been a trend of increasing chronic disease morbidity in the adult population over the last several decades. Although there is debate whether this increase will continue, it appears there will be large numbers of adults with chronic disease, limited function, and regular use of prescription medications. National data also indicate that the proportion of elderly using dental services has increased over the last two decades to a level almost equal to that of many other age groups.

To put what is known about the oral health status of special populations in perspective, we frame the remainder of our conclusions around four questions that might be expected to be addressed by epidemiologic and clinical research. These questions were enumerated earlier in this paper, but are repeated as a basis for concluding comments:

1. Do these special populations have different prevalence rates for oral diseases?

2. Are there different patterns of diseases in these special populations, i.e., do incidence rates or rates of disease progression differ?

3. Are common preventive procedures more difficult to apply and do they have different effects on these special populations?

4. What are the characteristics of these special populations that have an impact on the amount, type, and method of dental treatment?

Based on our definition of geriatric patients, none of these questions can be answered except for some reported clinical impressions about the type, amount, and method by which dental treatment can be performed. There are no studies that examine the oral health status of adults who are frail, functionally dependent, or homebound. Thus, these questions can be addressed only for the elderly population and the child handicapped population.

A pattern of reduction of edentulism rates in older populations seems to be true in national, as well as regional data. There is also evidence of a significant number of dentate people to be treated in long-term care institutions. This implies that a rather wide range of dental procedures may need to be contemplated for this population.

Existing prevalence data indicate that older people are more likely to have oral cancer. If incidence rates are not decreasing, oral cancer may become a more significant problem. There is a need for studies of psychosocial and behavioral characteristics that may be associated with oral cancer. This task will need to involve cooperative research since oral cancer is a disease with low incidence and it is particularly hard to reliably determine incidence rates and potential risk factors.

The limited data available indicate that denture problems and denture-related lesions constitute a large problem for the elderly population. While additional studies on representative groups are needed to more reliably and validly assess these problems, one must keep in mind that if the incidence of edentulism is decreasing, no reliable predictions can be made about future prevalence or risk factors for denture problems or denture-related lesions.

Occlusal attrition and cervical abrasion are conditions that may be relative-

ly prevalent in the elderly population. However, there is no national information on these conditions, and we have no knowledge of their incidence or rates of progression. We do not even know whether these are oral problems themselves or whether they are risk factors for other oral problems.

There is some evidence in regional studies that coronal caries is as large a problem for the elderly population as for any age group in U.S. society. Evidence regarding coronal caries rates in handicapped child patients is equivocal. At this point, we can probably conclude that coronal caries is an oral problem in special populations with a prevalence rate that is at least equal to other age groups. Prevalence rates are usually used to plan and develop policies for prevention, treatment, or manpower planning. However, with declining rates of caries, it is unwise to make long-range predictions. We have no idea what the future incidence of caries will be in these populations. For example, we do not know whether the handicapped child populations have benefitted from the same decrease in caries rates as other children have. We have no knowledge of coronal caries incidence rates, rates of progression, differing tooth susceptibility, or the efficacy of common preventive procedures in the elderly and handicapped. If we are concerned only with healthy elderly, they probably provide no special problems in the amount and type of dental treatment performed.

While root caries has not been reported in handicapped child populations, there is evidence that root caries may be a significant problem in the elderly. Since there is no information on incidence of root caries and its pattern of attack in the mouth, the level of knowledge is the same as for coronal caries. However, common preventive procedures such as fluoride treatments, which have been widely used for the prevention of coronal caries, may have a different efficacy for root caries.

The epidemiology of periodontal disease at all ages is confused. There is very little known about periodontal disease among the elderly and the handicapped. It has generally been found that gingivitis has a high prevalence in the handicapped population, but there is no solid information regarding periodontitis. If periodontal disease is defined as the presence of bleeding, calculus, or moderate pocketing, then

the prevalence in elderly groups may be relatively high. However, if periodontal disease is defined as advanced pocketing and destruction, then the prevalence may be quite low. Data are too scarce at this time to draw any definite conclusions for policy purposes. Incidence data are needed to assess the long-range outcomes of gingivitis, periodontal pocketing, and loss of attachment; to identify risk factors; and to determine if those risk factors are different for the geriatric population.

The greatest difficulties in assessing the oral health status of special population groups arise from the way these groups are classified in the collection and analyses of epidemiologic data. In the past, special populations have been categorized by age or developmental disability criteria. A more appropriate classification for the geriatric or handicapped populations may be the level of functional ability. Such a classification is needed before a valid assessment can be made of the status of oral health in special populations. Future studies should investigate whether the incidence rates and rates of disease progression differ among people with different functional classifications, and additional studies should explore the relative effectiveness of prevention regimens and treatment outcomes for people in these "special patient" classifications.

REFERENCES

1. Ainamo, J. Changes in the Frequency of Edentulousness and Use of Removable Dentures in the Adult Population of Finland. *Comm. Dent. Oral Epidemiol.* 11(2):122-26, 1983.
2. Ainamo, J., D. Barnes, G. Beagrie, T. Cutress, and J. Martin. Development of the World Health Organization (WHO) Community Periodontal Index of Treatment Needs (CPITN). *Int. Dent. J.* 32(3):281-91, 1982.
3. Akpata, E. S. Molar Tooth Attrition in a Selected Group of Nigerians. *Comm. Dent. Oral Epidemiol.* 3(3):132-35, 1975.
4. Axtell, L. M., A. J. Asire, and M. H. Myers. Cancer Patient Survival. Report N:5 SEER Program. DHEW Publication No. 77-992, Washington, D.C., 1976.
5. Banting, D. W., R. P. Ellen, and E. D. Fillery. Prevalence of Root Surface Caries Among Institutionalized Older Persons. *Comm. Dent. Oral Epidemiol.* 8(2):84-88, 1980.
6. Bartoshuk, L. M. The Psychophysics of Taste. *Am. J. Clin. Nutr.* 31(6):1068-77, 1978.
7. Baum, B. J., and L. Bodner. Aging and Oral Motor Function: Evidence for Altered Performance Among Older Persons. *J. Dent. Res.* 62(1):2-6, 1983.
8. Baum, B. J. Evaluation of Stimulated

- Parotid Saliva Flow Rate in Different Age Groups. *J. Dent. Res.* 60(7):1292-96, 1981.
9. Baum, B. J. Research on Aging and Oral Health: An Assessment of Current Status and Future Needs. *J. Spec. Care Dent.* 1(4):156-65, 1981.
 10. Beck, J. D., R. J. Hunt, J. S. Hand, H. M. Field. Prevalence of Root Caries and Coronal Caries in a Non-institutionalized Elderly Population. *J. Am. Dental Assoc.*, 1985.
 11. Beck, J. D. The Epidemiology of Dental Diseases in the Elderly. *Gerodontology* 3(1):5-15, 1984.
 12. Beck, J. D., P. A. Lainson, H. M. Field, and B. F. Hawkins. Risk Factors for Various Levels of Periodontal Disease and Treatment Needs in Iowa. *Comm. Dent. Oral Epidemiol.* 12(1):17-22, 1984.
 13. Beck, J. D., N. C. Cons, H. M. Field, and J. Walker. The Iowa Survey of Oral Health: 1980. A monograph, Iowa City, IA: The University of Iowa, 1982.
 14. Bellini, H. T., and P. Gjermo. Application of the Periodontal Treatment Need System (PTNS) in a Group of Norwegian Industrial Employees. *Comm. Dent. Oral Epidemiol.* 1(1):22-29, 1973.
 15. Bergstrom, J., and S. Lavstedt. An Epidemiologic Approach to Toothbrushing and Dental Abrasion. *Comm. Dent. Oral Epidemiol.* 7(1):57-64, 1979.
 16. Brody, J. A. Facts, Projections, and Gaps Concerning Data on Aging. *Public Health Rep.* 99(5):468-75, 1984.
 17. Brown, A. M., and A. Young. The Effects of Age and Smoking on the Maturation of the Oral Mucosa. *Acta Cytol.* 14(9):566-69, 1970.
 18. Brown, J. P., and D. R. Schoedel. A Review of Controlled Surveys of Dental Disease in Handicapped Persons. *J. Dent. Child.* 43(5):313-20, 1976.
 19. Chaucey, H. H., K. K. Kapur, J. E. House, and L. Rissen. The Incidence of Coronal Caries in Normal Aging Male Adults. *J. Dent. Res.* 57(Spec. Iss.):148, Abstract 296, 1978.
 20. Clarkson, J. J., and D. M. O'Mullane. Edentulism in the United Kingdom and Ireland. *Comm. Dent. Oral Epidemiol.* 11(5):317-20, 1983.
 21. Cohen, M. M., and R. A. Winer. Dental and Facial Characteristics in Down's Syndrome (Mongolism). *J. Dent. Res.* 44(2):197-208, 1975.
 22. Colvez, A., and M. Blanchet. Disability Trends in the United States Population. 1966-76: Analysis of Reported Causes. *Am. J. Pub. Health* 71(5):464-71, 1981.
 23. Cutler, S. J., and J. L. Young. Third National Cancer Survey: Incidence Data. National Cancer Institute Monograph E1:1-454, 1975.
 24. Cutress, T. W. Periodontal Disease and Oral Hygiene in Trisomy 21. *Arch Oral Biol.* 16(11):1345-55, 1971.
 25. Entwistle, B. A., and P. S. Casamassimo. Assessing Dental Health Problems of Children with Developmental Disabilities. *Dev. Behav. Pediatr.* 2(3):115-21, 1981.
 26. Ettinger, R. L., and J. D. Beck. Geriatric Dental Curriculum and the Needs of the Elderly. *Spec. Care Dent.* 4(5):207-13, 1984.
 27. Ettinger, R. L., J. D. Beck, and J. Jakobsen. Removable Prosthodontic Treatment Needs: A Survey. *J. Pros. Dent.* 51(3):419-27, 1984.
 28. Feldman, R. S., and H. H. Chauncey. Smoking and Aging Effects on Oral Health. In *Smoking and Aging*. Edited by R. Bosse and C. L. Rose. Lexington, Mass.: Lexington Books, 1984, p. 25.
 29. Feldman, R. S., K. K. Kapur, J. E. Alaman, and H. H. Chauncey. Aging and Mastication: Changes in Performance and in the Swallowing Threshold with Natural Dentition. *J. Am. Geriatrics Soc.* 28(3):97-103, 1980.
 30. Franks, A. S. T., and B. Hedegard. *Geriatric Dentistry*. Oxford: Blackwell Scientific Publications, 1973, p. 121.
 31. Grabowski, M., and A. Bertram. Oral Health Status and Need of Dental Treatment in an Elderly Danish Population. *Comm. Dent. Oral Epidemiol.* 3(3):108-15, 1975.
 32. Graham, S., H. Dayal, M. Rohrer, M. Swanson, H. Sultz, D. Shedd, and S. Fishman. Dentition, Diet, Tobacco, and Alcohol in the Epidemiology of Oral Cancer. *J. Nat. Cancer Inst.* 59:1611-17, 1977.
 33. Grzegorzczak, P. B., S. W. Jones, and C. M. Mistretta. Age-related Differences in Salt Test Acuity. *J. Gerontol.* 34(6):834-40, 1979.
 34. Hand, J. S., and J. M. Whitehill. The Prevalence of Oral Mucosal Lesions in an Elderly Population. *J. Am. Dent. Assoc.*, 1985.
 35. Hazen, S. P., N. W. Chilton, and H. M. Rappaport. Root Surface Caries: Surface Distribution in Two Large Population Groups. *J. Dent. Res.* 53(Spec. Issue):254, Abstract 798, 1974.
 36. Healy, A. Personal communication. Oct. 1984.
 37. Healy, A. Developmental Disability—A New Term for Old Conditions. *J. Dent. Handicapped* 3(11):5-9, 1977.
 38. Hecht, S. S., and J. Friedman. The High Incidence of Cervical Dental Caries Among Drug Addicts. *Oral Survey* 2:1428-32, 1949.
 39. Hill, M. W., and D. J. Rowe. Influence of Aging on Oral Cancer. *Dent. Hygiene* 56(8):26-30, 1982.
 40. Hix, J. O. and T. J. O'Leary. The Relationship Between Cemental Caries, Oral Hygiene Status, and Fermentable Carbohydrate Intake. *J. Periodontol.* 47(7):398-404, 1976.
 41. Hughes, J. T., R. G. Rozier, and D. L. Ramsey. Natural History of Dental Diseases in North Carolina 1976-1977. Durham, NC: Carolina Academic Press, 1982, pp. 250-54.
 42. Hugoson, A., and T. Jordan. Frequency Distribution of Individuals Aged 20-70 Years According to Severity of Periodontal Disease. *Comm. Dent. Oral Epidemiol.* 10(4):187-92, 1982.
 43. Hugoson, A., and G. Koch. Oral Health in 1000 Individuals Aged 3-70 Years in the Community of Jonkoping, Sweden. *Sued. Dent. J.* 3(3):69-87, 1979.
 44. Hunt, R. J., J. D. Beck, J. Lemke, F. J. Kohout, and R. Wallace. Edentulism and Oral Health Problems Among Elderly Rural Iowans: The Iowa 65+ Rural Health Study. *Am. J. Publ. Health*, 1985.
 45. Hunt, R. J., H. M. Field, and J. D. Beck. The Prevalence of Periodontal Conditions in a Non-institutionalized Elderly Population. *Gerodontology*, 1985.
 46. Hunt, R. J., and J. D. Beck. Methodologic Considerations in an Epidemiologic Dental Survey of an Elderly Group. Paper presented at the Annual Meeting, American Association of Public Health Dentistry, Atlanta, 1984.
 47. Jette, A. M., and L. G. Branch. The Framingham Disability Study: II. Physical Disability Among the Aging. *Am. J. Pub. Health* 71(11):1211-16, 1981.
 48. Johnson, N. P., and M. A. Young. Periodontal Disease in Mongols. *J. Periodontol.* 34(1):41-47, 1963.
 49. Kamen, S. Dental Management of Patients with Mental Retardation and Related Developmental Disorders. *J. Canad. Dent. Assn.* 47(10):663-66, 1981.
 50. Katz, R. V., S. Hazen, N. Chilton, and D. Mumma. The Prevalence and Intra-oral Distribution of Root Caries in an Adult Population. *Caries Res.* 16(3):265-72, 1982.
 51. Langer, A. Oral Signs of Aging and Their Clinical Significance. *Geriatrics* 31(12):63-69, 1976.
 52. Leake, J. L., and B. P. Martinello. Oral Health Status of Independent Elderly Persons in London, Ontario. *J. Canad. Dent. Assn.* 38(1):31-34, 1972.
 53. Loe, H., and J. Silness. Periodontal Disease in Pregnancy. I. Prevalence and Severity. *Acta Odont. Scand.* 21(6):533-51, 1963.
 54. Lohse, W. G., H. G. Carter, and J. A. Brunelle. The Prevalence of Root Surface Caries in a Military Population. *Military Med.* 142(9):700-03, 1977.
 55. MacHudis, M. Dentistry for the Elderly. In *Clinical Aspects of Aging*, 2nd edition. Edited by W. Reichel. Baltimore, Md.: Williams and Wilkins Co., 1983, pp. 498-500.
 56. Mandel, I. D., and S. Wotman. The Salivary Secretions in Health and Disease. *Oral Sci. Rev.* 8:25-47, 1976.
 57. Manderson, R. D., and R. L. Ettinger. Dental Status of the Institutionalized Elderly Population of Edinburgh. *Comm. Dent. Oral Epidemiol.* 3(3):100-07, 1975.
 58. Markkainen, H., M. Rajala, and K. Paunio. Periodontal Treatment Needs of the Finnish Population Aged 30 Years and Over. *Comm. Dent. Oral Epidemiol.* 11(1):25-32, 1983.
 59. Mosadomi, A., G. Shklar, E. R. Loftus, and H. H. Chauncey. Effects of Tobacco Smoking and Age on Keratinization of Palatal Mucosa: A Cytologic Study. *Oral Surg.* 46(3):413-17, 1978.
 60. National Center for Health Services Research. National Health Care Expenditures Study. Prescribed Medicines: Use, Expenditures and Source of Payment. Data Preview 9. PHS Publication No. 82-3320, Hyattsville, MD, 1982, p. 5.
 61. National Center for Health Statistics. Changes in Mortality Among the

- Elderly: United States, 1940-78. Series 3, PHS Publication No. 84-106a, Hyattsville, MD, 1984, p. 5.
62. National Center for Health Statistics. Changing Mortality Patterns, Health Services Utilization and Health Care Expenditures: U.S., 1978-2003. Series 3, No. 23. PHS Publication No. 83-1407, Hyattsville, MD, 1983, p. 22.
 63. National Center for Health Statistics. Current Estimates from the National Health Interview Survey: United States, 1981. Series 10, No. 141, PHS Publication No. 82-1569, Hyattsville, MD, 1982, p. 30.
 64. National Center for Health Statistics. Dental Visits. Volume and Interval Since Last Dental Visit: United States, 1978 and 1979. Series 10, No. 138, PHS Publication No. 82-1566, Hyattsville, MD, 1982, p. 6.
 65. National Center for Health Statistics. Drug Utilization in Office-Based Practice, A Summary of Findings: National Ambulatory Medical Care Survey, United States, 1980. Series 13, No. 65. PHS Publication No. 83-1726, Hyattsville, MD, 1982, pp. 20-21.
 66. National Center for Health Statistics. Current Estimates from the National Health Interview Survey: United States, 1979. Series 10, No. 136, PHS Publication No. 81-1564, Hyattsville, MD, 1981, pp. 34-37.
 67. National Center for Health Statistics. Decayed, Missing, and Filled Teeth Among Persons 1-74 Years, United States. Series 11, No. 223. DHHS Publication No. 81-1673. Hyattsville, MD, 1981.
 68. National Center for Health Statistics. The Nation's Use of Health Resources, 1979. PHS Publication No. 80-1240, Hyattsville, MD, 1980, p. 92.
 69. National Center for Health Statistics. Edentulous Persons, United States 1971. Series 10, No. 89. DHEW Publ. No. 74-1516, Rockville, Md., 1974.
 70. National Center for Health Statistics. United States Life Tables by Edentulous or Edentulous Condition, 1971 and 1957-58. Series 2, No. 64. DHEW Publication No. 75-1338, Rockville, Md., 1974.
 71. National Center for Health Statistics. Decayed, Missing, and Filled Teeth in Adults, United States, 1960-62. Series 11, No. 23. DHEW Publication No. 1000, Washington, D.C., 1967.
 72. National Center for Health Statistics. Characteristics of Nursing Home Residents, Health Status, and Care Received: National Nursing Home Survey, United States, 1977. Series 13, No. 51, PHS Publication No. 81-1712, Hyattsville, MD, pp. 45-56, 62-64.
 73. Nizel, A. E. Role of Nutrition in the Oral Health of the Aging Patient. *Dent. Clin. North. Am.* 20(3):569-84, 1976.
 74. Nowak, A. J. Dentistry for the Handicapped Patient. St. Louis, Mo.: C. V. Mosby, 1976, pp. 5, 6.
 75. Page, R. C., and H. E. Schroeder. Periodontitis in Man and Other Animals: A Comparative Review. Basel: Karger, 1982.
 76. Plasschaert, A. J. M., T. Folmer, J. L. M. VanDenHeuvel, J. Jansen. L. VanOpjimen, and S. L. J. Wouters. An Epidemiologic Survey of Periodontal Disease in Dutch Adults. *Comm. Dent. Oral Epidemiol.* 6(2):65-70, 1978.
 77. Ramfjord, S. P. Indices for Prevalence and Incidence of Periodontal Disease. *J. Periodontol.* 30(1):51-59, 1959.
 78. Ravald, N., and S. E. Hamp. Prediction of Root Surface Caries in Patients Treated for Advanced Periodontal Disease. *J. Clin. Periodont.* 8:400-04, 1981.
 79. Rise, J. Analysis of Dental Status Among Old-age Pensioners in Norway. *Comm. Dent. Oral Epidemiol.* 10(5):282-86, 1982.
 80. Russell, A. L. A System of Scoring for Prevalence Surveys of Periodontal Disease. *J. Dent. Res.* 35(2):350-59, 1956.
 81. Sandler, E. S., M. W. Roberts, and A. M. Mojcicki. Oral Manifestations in a Group of Mentally Retarded Patients. *J. Dent. Child.* 41(3):207-11, 1975.
 82. Schonfeld, W. H., and D. Warren-Hicks. Estimating the Need for Dental Care and Dental Health Manpower in North Carolina. In *Planning for Dental Care on a Statewide Basis*. Edited by J. W. Bawden and G. H. DeFries. Chapel Hill, NC: Dental Foundation of North Carolina, 1981, pp. 122-23.
 83. Sheppard, I. M., L. R. Schwartz, and S. M. Sheppard. Oral Status of Edentulous and Complete Denture-wearing Patients. *JADA* 83(3):614-20, 1971.
 84. Shklar, G. Oral Pathology in the Aging Individual. In *Geriatric Dentistry*. Edited by C. J. Toga, K. Nandy, and H. H. Chauncey. Lexington, Mass.: Lexington Books, 1979, pp. 132-38.
 85. Silverberg, E. Cancer Statistics 1983. *CA: Cancer J. Clinicians* 33(1):9-25, 1983.
 86. Smith, E. M. Epidemiology of Oral and Pharyngeal Cancers in the United States: A Review of Recent Literature. *J. Nat. Cancer Inst.* 63:1189-98, 1979.
 87. Smith, E. M. Epidemiology of Cancers of the Oral Cavity and Pharynx. In *Epidemiology of Cancer of the Digestive Tract*. Edited by P. Correa and W. Haenszel. The Hague: Martinus Nishoff Pub., 1982.
 88. Smith, J. M. Oral and Dental Discomfort—A Necessary Feature of Old Age? *Age Aging* 8:25-31, 1979.
 89. Smith, J. M. and A. Sheiham. How Dental Conditions Handicap the Elderly. *Comm. Dent. Oral Epidemiol.* 7(6):305-10, 1979.
 90. Spratley, M. H. Supply and Demand for Prosthetic Treatment in Victoria, Australia. *Comm. Dent. Oral Epidemiol.* 6(3):151-58, 1978.
 91. Stamm, J. W., and D. W. Banting. Comparison of Root Caries Prevalence in Adults with Life-Long Residence in Fluoridated and Non-fluoridated Communities. *J. Dent. Res.* 59(Spec. Iss.):405, Abstract 552, 1980.
 92. Storer, R. The Gastrointestinal System: The Oral Tissues. In *Textbook of Geriatric Medicine and Gerodontology*, 2nd edition. Edited by J. C. Brocklehurst. London: Churchill Livingstone, 1978, pp. 339-41.
 93. Sumney, D. L., H. V. Jordan, and H. R. Englander. The Prevalence of Root Surface Caries in Selected Populations. *J. Periodontol.* 44(8):500-04, 1973.
 94. Svaton, B. and L. A. Heloe. Dental Status and Treatment Needs Among Institutionalized Mentally Subnormal Persons in Norway. *Comm. Dent. Oral Epidemiol.* 3(5):208-13, 1975.
 95. Swallow, J. N. Dental Disease in Handicapped Children: An Epidemiologic Study. *Isr. J. Dent. Med.* 21(1):41-51, 1972.
 96. Swallow, J. N., M. A. J. Van Groenestijn, C. J. Maas-DeWaal, and P. A. Mileman. A Survey of Edentulous Individuals in a District in Amsterdam, the Netherlands. *Comm. Dent. Oral Epidemiol.* 6(4):210-16, 1978.
 97. Sznajder, N., J. J. Carraro, E. Otero, and F. A. Carranza. Clinical Periodontal Finding in Trisomy 21 (Mongolism). *J. Periodont. Res.* 3(1):1-5, 1968.
 98. Sznajder, N., and R. Fenick. Hallazgos Peridontales en Niños Con Parálisis Cerebral Infantil. *Rev. Assoc. Odont. Argent.* 55(3):126-29, 1967.
 99. Tesini, D. A. An Annotated Review of the Literature of Dental Caries and Periodontal Disease in Mentally Retarded Individuals. *Spec. Care Dent.* 1(2):75-87, 1981.
 100. Tesini, D. A. Determinants in the Oral Hygiene Status of Mentally Retarded Individuals. *Comm. Dent. Oral Epidemiol.* 8(7):355-59, 1980.
 101. Tesini, D. A., M. M. Cohen, J. P. O'Donnell, and R. E. Clark. Comparison of Periodontal Disease in Institutionalized and Noninstitutionalized Mental Defectives. *J. Dent. Res.* 55(Spec. Iss.), Abstract 796, 1976.
 102. U.S. Bureau of the Census. Social and Economic Characteristics of the Older Population, 1978. Current Population Reports. Series P-23, No. 85, Washington, D. C.: U. S. Government Printing Office, 1979.
 103. U.S. Department of Education. Sixth annual Report to Congress on the Implementation of Public Law 94-142: The Education for All Handicapped Children Act. U.S. Department of Education, 1984, pp. 1, 3.
 104. Vehkalahati, M., M. Rajala, R. Tuominen, and I. Paunio. Prevalence of Root Caries in the Adult Finnish Population. *Comm. Dent. Oral Epidemiol.* 11(3):188-90, 1983.
 105. Weintraub, J. A., and B. A. Burt. Oral Health Status in the United States: Edentulism. *J. Dent. Educ.* 49(6):368-76, 1985.
 106. Williams, R. R. and J. W. Horm. Association of Cancer Sites with Tobacco and Alcohol Consumption and Socio-economic Status of Patients: Interview Study From the Third National Cancer Survey. *J. Nat. Cancer Inst.* 58:525-47, 1977.
 107. World Health Organization. Epidemiology, Etiology, and Prevention of Periodontal Disease: Report of a WHO Scientific Group. Tech. Rep. Series No. 621. Geneva: World Health Organization, 1978.

Intra-oral Effects of Drugs in Elderly Patients

Karen A. Baker¹ and Ronald L. Ettinger, D.D.S.²

Ms. Baker is a faculty member in the Colleges of Dentistry and Pharmacy at the University of Iowa.

²Dr. Ettinger is a faculty member in the Department of Removable Prosthodontics at the University of Iowa.

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Abstract. — The elderly are living longer, more productive lives in part due to advances in drug therapy. Along with therapeutic effects, many drugs produce undesirable effects which mimic diverse disease states. This article reviews the major categories of chemically-induced oral disease and provides lists of drugs commonly implicated. Some drugs directly affect the oral cavity causing tooth discoloration, soft tissue pigmentation, or oral ulceration. Other agents adversely affect salivary glands, taste perception, or normal oral flora by virtue of their systemic pharmacologic effects. Systemic adverse reactions which manifest orally include drug-induced blood dyscrasias, vitamin deficiencies, and neurological disorders. Drugs known to produce idiosyncratic oral eruptions such as lichenoid reactions, benign mucous membrane pemphigoid, erythema multiforme, or lupus erythematosus are listed and discussed.

Introduction

The elderly are living longer, more productive lives in part due to advances in drug therapy. (Fisher, 1980) However, as people grow older, their rate of drug utilization increases. Figures from a 1982 Senate Committee on Aging report revealed that the elderly comprise 11.5% of the U.S. population but their use of medication accounts for 25 to 30% of total U.S. drug expenditures. (U.S. Gov't Printing Office, 1982) Over-the-counter (OTC) medications are probably used by the elderly at a similarly high rate. Along with a therapeutic effect, many drugs produce undesirable effects which mimic diverse disease states. Because the elderly take larger numbers of drugs

Age (in years)	Total Population (in thousands)	Persons with at least One Prescribed Medicine (percent)	Prescribed Medicines Per Person (mean)
19 to 24	22,299	53.2	2.6
25 to 54	78,472	59.1	4.2
55 to 64	20,180	69.1	8.2
65 or older	22,284	75.2	10.7
Total	212,098	58.2	4.3

NMCES household data: United States, 1977, National Center for Health Services Research.

than any other group, they are particularly susceptible to such adverse effects (Table 1). (Fisher, 1980) Adverse drug reactions rise in direct proportion to the number and frequency of drug-dose exposures. Of the population as a whole, 3-5% of all hospital admissions are a direct result of adverse drug reactions. (Brady, 1974) It has been shown that 15-30% of hospitalized patients experience drug reactions while under treatment which result in an average doubling in length of hospital stay. Approximately 30,000 deaths, 1.5 million hospital admissions, and 1-3 billion dollars in expenditures are related to drug-associated hospitalizations annually. (Brady, 1974) Because of the increased number and frequency of drug-dose exposures and other factors, the elderly are at a greater risk of experiencing drug-related morbidity and mortality.

The knowledge of drug therapy in elderly patients is becoming more important because of the following factors:

- (1) More geriatric dental patients will be treated in the future.
- (2) A reduction in medication costs to elderly can be attained by rational drug therapy decision-making.
- (3) The drug-related problems of the elderly need to be understood because of the risks involved in increased medication usage.
- (4) The number of medications available as well as the indications for their clinical use will continue to increase, necessitating a growing knowledge of drug effects on the elderly.

Therefore, clinicians require complete, accurate, and current medical records

and a complete medication history including both prescription and non-prescription (OTC) products in order to provide rational health care for the elderly patient.

This paper will discuss some of the areas of concern regarding drugs and the elderly. The major categories of drug-induced oral disease will be reviewed and drugs commonly implicated will be listed as a quick reference for clinicians.

AREAS OF CONCERN REGARDING DRUGS AND THE ELDERLY

Overutilization

Overutilization of prescription and OTC drugs by elderly persons represents a significant health care problem. In general, both institutionalized and independently-living geriatric patients take more drugs than they need. According to a 1977 survey, the mean annual prescription drug expense incurred by the over 65 population was \$75 compared to \$35 for the general population. (Kasper et al., 1980) Older persons often are dependent upon medication in order to function in daily life. Often the patient develops a ritualistic dependence on medication which extends past the period of legitimate need for therapy. Due to the patient's strong feeling, physicians often grant refills past the point of need. Older people may also display this type of behavior in their use of OTC drugs and vitamin products.

Underutilization

Just as the elderly may tend to overuse medications, they may also underuse them. Therapy may be discontinued due to unpleasant side effects or high cost of prescription drugs. Older people may stop taking medication if they fail to keep an appointment or if there is a breakdown in patient-practitioner communication.

Drug compliance

Compliance with medication regimens is a formidable problem in all age groups. Various compliance studies indicate that 50-60% of outpatients take their medications improperly. The geriatric population is particularly prone to non-compliance because they take more drugs and therefore take more daily doses of drugs.

Schwartz et al. (1962) studied the medication habits of 178 elderly patients and found that 59% made medication errors. Errors of omission accounted for 20% of all errors. Patients actually took medications prescribed for someone else in 17% of the cases. About 10% of all medication mistakes involved incorrect dosages and 6% involved improper dosing interval.

In general, 25% of these errors were considered to be potentially serious. Patients in the 75-79 year-old age group had the highest error rate. Factors predisposing those patients to medication mistakes included 1) multiple-disease states, 2) higher numbers of medications taken, and 3) inability to cope with the environment. Reading ability did not affect the medication error rate in this group of elderly people.

Adverse drug reaction

Adverse drug reactions occur when a drug is administered to a patient and causes a bothersome or potentially harmful effect other than that which was intended. Many terms have been used to describe this reaction, such as drug side-effects, susceptibility, hypersensitivity, idiosyncrasy, intolerance, and toxicity. Individuals often apply these terms indiscriminately in many different contexts, resulting in some confusion.

The effect of adverse drug reactions on the elderly is of great concern. Since the incidence of adverse reactions is directly related to number and frequency of drug-dose exposures, the elderly

are more susceptible to drug misadventures due to multiple disease states and overutilization. Adverse drug reactions may be manifest in the oral cavity either directly or indirectly as a result of some systemic effect. Direct effects on the oral cavity will be discussed first and drugs commonly implicated are listed in Table 2.

Table 2.
Direct effects of drugs in the oral cavity.

A. TOOTH DISCOLORATION
stannous flouride
chlorhexidine
tetracyclines
B. SOFT TISSUE PIGMENTATION
heavy metals
phenothiazines
phenytoin
busulphan
C. SOFT TISSUE ULCERATION
aspirin
phenylbutazone
potassium chlorite
gentian violet
flavoring oils

DIRECT EFFECTS IN THE ORAL CAVITY

Tooth discoloration

Extrinsic brownish black staining of teeth has been caused by stannous flouride toothpastes as well as topical applications of stannous gel. (Naylor, Einslie, 1967) (Vogel, 1975) The stain may be due to a combination of stannous and sulphides released by oral bacteria, producing insoluble stannous sulphide. (Naylor and Einslie, 1967) (Jackson and Surcliffe, 1967) The use of a mouthwash or dentrifice containing chlorhexidine frequently results in a brownish-grey discoloration of the teeth. (Erikson and Gjermo, 1973) Chlorhexidine may produce this effect by denaturing pellicle proteins which favors the retention of staining on tooth surfaces. (Hjeljord et al., 1973)

Intrinsic discoloration can be caused by tetracycline antibiotics which compete for calcium ions in developing hard tissues and are incorporated primarily into dentin. (Moffitt et al., 1974) The severity of discoloration is related to drug dosage, duration of therapy, stage of odontogenesis, and the particular drug involved. (Moffitt et al., 1974) Staining appears more often when the total dosage exceeds 3 grams or the duration of treatment exceeds 10 d.

(Conchie et al., 1970) Of the tetracycline analogues, tetracycline hydrochloride produces the most severe staining while oxytetracycline and doxycycline stain the least. (Moffitt et al., 1974)

Soft tissue pigmentation

Pigmentation of the oral mucosa or skin can be caused by direct deposition of heavy metals. Bismuth, silver, gold, mercury and lead can all cause pigmentation but these reactions are rarely seen today. Gold salts are still used therapeutically for rheumatoid arthritis. Long-term systemic administration can cause a purple discoloration of the gingiva and a red oral mucosa. (Burket, 1977)

Some drugs cause discoloration of oral mucosa by stimulating melanin production. Phenothiazine antipsychotics such as chlorpromazine can produce a bluish-grey discoloration of the oral mucosa. (Vogel and Deasy, 1977) After taking phenytoin for 1 year, 10% of patients will develop a patchy brown pigmentation on areas exposed to light. (Levan-tine and Almeyda, 1973) Progestins in oral contraceptives may cause increased melanin pigmentation of the face and oral mucosa. (Sotaniemi et al., 1968) Busulphan, an anti-cancer drug, can produce a widespread brown pigmentation involving oral mucosa due to increased melanin deposition. (Desai, 1965)

Soft tissue ulceration

Iatrogenic ulceration of oral mucosa can be a feature of many types of drug reactions. This section will only cover ulcerations caused by contact hypersensitivity or local chemical contact.

The majority of mucosal burns can be related to prolonged oral contact with aspirin. (Glick et al., 1974) The lesion usually involves gingival and buccal mucosa and appears as a white patch which can be removed to reveal a raw bleeding surface. Phenylbutazone and other related nonsteroidal anti-inflammatory agents have produced oral ulceration due to a local effect. (Almeyda and Baker, 1970) Highly concentrated potassium chloride tablets cause ulceration of gastrointestinal mucosa on prolonged contact. (McAroy, 1974) Gentian violet is sometimes used for the treatment of oral candidiasis but the dye itself can cause superficial necrosis especially if used in alcoholic formulations. (Horsfeld et al., 1976)

Contact hypersensitivity of the oral mucosa is analogous to allergic contact dermatitis and usually occurs at a localized site after repeated contact with the causative agent. (Silverman and Lozada, 1977) Agents implicated include cinnamon, menthol, thymol, and mint flavorings in chewing gum and dentifrices. Other substances associated with contact hypersensitivity include toothpastes, mouthwashes, cosmetics, antibiotic lozenges, topical analgesics, periodontal packs, impression materials, denture adhesives, and iodine. Initially lesions can present as edema, burning, or erythema at the contact site and vesiculation and ulceration can follow. (Duxbury, 1980)

SYSTEMIC PHARMACOLOGIC EFFECTS

Effects of drugs on salivary glands

Many drugs affect salivary glands with varying severity. Although precise incidence figures are not available, xerostomia is probably the most common drug-induced oral effect seen in the elderly.

Xerostomia

Dryness of the mouth, or xerostomia, is caused by many drugs and can be a serious problem, especially in the elderly patient where salivary flow may already be reduced. Clinical problems associated with chronic dry mouth are: reduced denture retention, increased dental caries, difficulty masticating, swallowing, and talking, traumatic injury to mucous membranes, and infections of the pharynx and salivary glands. (Ettinger, 1981) The mucosa may appear atrophic, inflamed, fissured or ulcerated. Common patient complaints include sore tongue, burning mucosa, or generalized mouth soreness, all of which may be indicative of oral candidosis. (Ettinger, 1981) (Chisholm et al., 1978)

Drugs which commonly cause xerostomia are listed in Table 3 by pharmacologic category and chemical name. Drug-induced xerostomia must be managed symptomatically unless the drug responsible can be replaced, as is often the case with antidepressants and antipsychotics. (Ettinger, 1981) The relative drying effects of these two groups of drugs are also indicated in

Table 3. Drugs which frequently cause xerostomia.

1. Anticholinergic Drugs methantheline bromide (Banthine®) propantheline bromide (Probanthine®) dicyclomine (Bentyl®) trihexyphenidyl (Artane®) benztropine mesylate (Cogentin®) flavoxate (Urispas®) oxybutynin (Ditropan®)	2. Systemic Antihistamines* diphenhydramine-H (Benadryl®) clemastine-H (Tavist®) chlorpheniramine-M (Chlor-Trimeone®) brompheniramine-M (Dimetane®) triprolidine-M (Actifed®) cyproheptadine-M (Periactin®) hydroxyzine-H (Atarax®, Vistatil®) promethazine-H (Phenergan®)
3. Antidepressants* amitriptyline-VH (Elavil®) imipramine-M (Tofranil®) desipramine-L (Norpramin®) trazodone-L (Desyrel®)	4. Antipsychotics* chlorpromazine-M (Thorazine®) thioridazine-H (Mellaril®) prochlorperazine-L (Compazine®) trifluoperazine-L (Stelazine®) thiothixene-L (Navane®) haloperidol-L (Haldol®)
5. Systemic Bronchodilators terbutaline (Brethine®) theophylline (Theodur®) aminophylline	6. CNS Stimulants dextroamphetamine phenentermine diethylpropion phenylpropanolamine (Dexatrim®) pseudoephedrine (Sudafed®)
7. Antineoplastics alkylating agents antimetabolites	9. Antihypertensives* reserpine-M (Serpasil®) clonidine-H (Catapres®) methyldopa-I (Aldomet®) guanabenz-H (Wytensin®) guanethidine-L (Ismelin®) guanadrel-L (Hylorel®) captopril-L (Capoten®) beta blockers-L (Inderal®, Tenormin®, Lopressor®)
8. Diuretics thiazides and related diuretics (Diuril®, Hydrodiuril®, Hygroton®) loop diuretics (Lasix®, Bumex®) potassium sparing diuretics (Midamor®, Aldactone®, Dyrenium®)	

*Xerostomic potency compared with other members of the category. VH = very high; L = low; H = high; U = unknown; M = moderate. Adapted from: *Facts and Comparisons*, Boyd JR, ed. St. Louis: Lippincott, 1984.

Table 3. Unfortunately, the effective treatment of xerostomia in the elderly is difficult and frustrating both for the patient and the dentist. Symptomatic management of xerostomia may be successful and involves the use of artificial saliva or saliva stimulants for soft tissue relief and of home-use fluoride gel for caries prevention. (Ettinger, 1981).

Salivary gland enlargement

A condition resembling mumps has been associated with the administration of sulfonamides, potassium chloride, insulin, isoproterenol, methyldopa, warfarin, phenylbutazone, iodides, phenothiazines, thiocyanate, and thiouracil. (Duxbury, 1980) Many different causal mechanisms appear to be involved but reactions subside when the offending drug is discontinued. The reaction is sometimes accompanied by

signs and symptoms of acute sialadenitis and xerostomia. (Ettinger, 1981)

Salivary gland pain

The antihypertensive drugs bretylium, clonidine, guanethidine, bethanidine, and methyldopa have been reported to cause occasional parotid pain. Although the mechanism is unclear, it may relate to the central or adrenergic blocking activity of each drug. (Klein, 1972) This activity may serve to decrease glandular vasoconstriction causing excessive hyperemia.

Taste Sensation

Various drugs can cause altered taste sensation (dysgeusia), diminished taste perception (hypogeusia), or complete loss of taste (ageusia). Griseofulvin, phenindione, D-penicillamine, metroni-

dazole, gold salts, and lithium carbonate commonly lead to these problems. (Walton, 1977) The mechanisms are uncertain, but the effects of drugs on taste may be mediated by their actions on trace metal ions such as nickel, zinc, and copper. These metals modulate the interaction of tastants with the membrane proteins of the taste pores. (Henkin et al., 1969) Although hypogeusia induced by penicillamine often resolves during drug therapy, there is usually no treatment other than withdrawal of the causal agent. (Jaffe, 1968)

Oral flora

Changes in the normal oral flora can be a result of either direct action of drugs in the oral cavity or indirect systemic effects on host susceptibility. Regular use of steroid inhalers (beta-methasone, triamcinolone) may suppress local immunological mechanisms, thereby predisposing to *Candida albicans* infections. (Lehnert, 1970) Immunosuppressive drugs such as azathioprine and systemic corticosteroids are used to decrease or eliminate the immune or inflammatory response. Frequently, *Candida albicans* and herpes virus type I take advantage of depressed defense mechanisms and are difficult to manage.

All antibiotics can potentially alter oral flora but only broad spectrum agents or combination therapy frequently cause clinically apparent candidosis in healthy patients. The role of antibiotic therapy in predisposing debilitated patients to candidosis is often complicated by multiple disease states and concomitant medications. (Odds, 1979)

ORAL MANIFESTATIONS OF SYSTEMIC ADVERSE REACTION

Drug-induced blood disorders

Drugs can interfere with blood formations in many ways and can induce conditions such as aplasia, agranulocytosis, thrombocytopenia, and anemia. These conditions frequently cause oral problems and the dentist is often the first health care professional to see the problem. (Weiss, 1973) The clinical signs of these conditions are similar to other diseases and clinical diagnosis is difficult. Symptoms include unresponsive

infections, unexplained hemorrhage, oral petechiae, pale mucosa, oral ulceration, elevated temperature, prolonged atrophy of the lingual papillae, and soreness of the tongue, mucosa, or throat. These manifestations have been reviewed in detail by Horler (1977) and are listed with their causative agents in Table 4.

Oral hemorrhage

Drugs which can cause abnormal oral bleeding are listed in Table 4. Nonsteroidal anti-inflammatory drugs such as ibuprofen and naproxen sodium have less antiplatelet activity than aspirin and rarely cause excessive bleeding.

Blood Dyscrasias

These reactions often occur after continuous drug therapy and onset of oral ulceration is often rapid. Many cytotoxic drugs directly affect bone marrow in a dose-related fashion. Other drugs affect bone marrow unpredictably, probably due to an immunological reaction. The reactions include i) agranulocytosis caused by phenylbutazone, thiouracil, and carbimazole; ii) hemolysis due to methyldopa or mephenamic acid; iii) thrombocytopenia due to quinidine, thiazides, and penicillamine; and iv) bone marrow aplasia due to sulfonamides, sulfonyleureas, carbamazepine, phenylbutazone, and gold salts.

Anemia

The oral mucosa can change due to hemolytic anemia. Drugs which can induce hemolytic anemia are listed in Table 4.

Drug-induced neurological disorders

Extrapyramidal syndromes

A number of drugs can cause extrapyramidal syndromes such as pseudo-parkinsonism, akathisia, atonia, acute dystonic reactions, or tardive dyskinesia. (Crane, 1968)

The orofacial musculature is often involved and abnormal lip and jaw movement, tongue protrusion, bruxism, trismus, dysphagia, salivation, and dislocation of the mandibular condyle may occur. (Walton, 1977) Pseudo-parkinsonism usually resolves upon drug withdrawal as does acute dystonia of the head and neck. However, tardive dyskinesia is a permanent side-effect of long-term drug therapy and does not resolve upon withdrawal of the drug. The most common movements seen with tardive dyskinesia are tongue protrusion, licking and smacking of the lips, sucking and chewing movements, and grimacing. (Kamen, 1975) (Laucciello et al., 1977) The drugs most often implicated include phenothiazine, thioxanthine, and butyrophenone antipsychotics and levodopa. Some common chemical names for these drugs are listed in Table 4.

Peripheral Neuropathies

Drugs reported to cause numbness, tingling, or burning of the face or mouth include streptomycin, isoniazid, nalidixic acid, nitrofurantoin, phenytoin, propranolol, tolbutamide, chlorpropamide, methysergide, and ergotamine. (Walton, 1977)

Table 4. Oral manifestations of systemic adverse reactions.

A. Drug-Induced Blood Disorders		
Oral Hemorrhage		
broad spectrum antibiotics		
warfarin sodium (Coumadin®)		
high-dose aspirin		
Agranulocytosis/Thrombocytopenia/Aplasia		
phenylbutazone	quinidine	sulfonamides (Gantanol®, Gantrisin®)
thiouracil	thiazides	sulfonyleureas (Orinase®, Tolinase®)
gold salts	penicillamine	carbamazepine (Tegretol®)
Anemia		
sulfonamides		penicillin
nitrofurantoin (Macrochantin®)		methyldopa (Aldomet®)
chloroquine		levodopa (Sinemet®)
B. Drug-induced Neurological disorders		
Extrapyramidal Syndromes		
haloperidol (Haldol®)		
trifluoperazine (Stelazine®)		
perphenazine (Trilafon®)		
levodopa (L-Dopa®, Sinemet®)		

IDIOSYNCRATIC DRUG ERUPTIONS

Lichenoid eruptions

Drug-induced lichenoid lesions can be indistinguishable from lichen planus both clinically and histologically. (Hay, Reade, 1978) Oral manifestations include white striations, plaques, erythematous patches, erosions, or ulcerations. The drug-induced lesions resolve upon drug discontinuance whereas true lichen planus may last for 20 or more years. (Walton, 1977) The drugs associated with lichenoid reactions are listed in Table 5.

Fixed drug eruptions

This type of eruption characteristically recurs at the same site and orally manifests as ulcerations, bullae, erythematous patches, or superficial erosions simulating herpetic lesions. (Kennett, 1968) This eruption is considered to be the result of a cell-mediated hypersensitivity response. (Walton, 1977) Drugs commonly implicated appear in Table 5.

Erythema multiforme

A great variety of causative factors have been identified, but about 40-80% of erythema multiforme cases have been associated with the administration of drugs. (Bottiger et al., 1975) The oral mucosa is often extensively involved and reddened patches may pass rapidly through a bullous phase to form an erosion. Patients often present with blood-encrusted labial erosions. The disease is self-limiting with healing 3-4 weeks after drug withdrawal; however, recurrences may be triggered by further exposure to the cause. The drugs most frequently involved are listed in Table 5. (Bottiger et al., 1975)

Disseminated lupus erythematosus

Drug-induced lupus manifests as a cutaneous rash, pulmonary, cardiac, muscle, and abdominal symptoms, along with fever, weight loss and lymphadenopathy. The oral mucosa is involved in 25% of cases and lesions appear as erythematous patches on the gingivae which break down to form painful ulcers. (Walton, 1977) Most drug-induced cases resolve upon removal of the causal agents. The drugs most commonly implicated appear in Table 5.

Table 5. Idiosyncratic drug eruptions.

A. Lichenoid Eruptions	methylidopa (Aldomet®)	chlorothiazide (Diuril®)
	chloroquine	furosemide (Lasix®)
B. Fixed Drug Eruptions	chlorthalidone (Diabinese®)	phenothiazines
	tolbutamide (Orinase®)	quinidine
C. Erythema Multiforme	tetracyclines	triprolidine
	gold salts	
D. Disseminated Lupus Erythematosus	barbiturates (Amytal®, Seconal®)	
	chlorthalidone (Diabinese®)	
E. Erythema Multiforme	sulfonamides (Gantanol®, Gantrisin®)	
	tetracyclines	
F. Dissecting Erythema	penicillins	
	anticonvulsants (Dilantin®)	
G. Erythema Multiforme	chlorthalidone (Diabinese®)	
	carbamazepine (Tegretol®)	
H. Dissecting Erythema	procainamide (Pronestyl®)	methylidopa (Aldomet®)
	hydralazine (Apresoline®)	primidone (Mysoline®)
I. Erythema Multiforme	phenytoin (Dilantin®)	thiouracil
	isoniazid (INH)	

DRUG EFFECTS ON THE PERIODONTIUM

Gingival overgrowth is a well-recognized side-effect of phenytoin. (Angelopoulos, 1975) The incidence appears to be about 40% although plaque control plays a crucial role in the treatment and prevention of the overgrowth. The onset and severity of the problem appear to be unrelated to drug dosage and there is some evidence to suggest that the severity of the symptoms decreases with increasing age. (Angelopoulos, 1975)

DIGANOSIS OF DRUG- INDUCED DISEASE

When the onset of oral side-effects is dramatic and occurs shortly after a drug has been administered, diagnosis is relatively easy. Difficulties arise because adverse drug reactions may be delayed or may continue after drug administration has ceased. These problems are compounded in an elderly patient who is taking a number of drugs with potentially adverse oral effects and serial drug elimination may be necessary to establish the inducing agent.

CONCLUSIONS

Dentists should be aware that a number of oral mucous membrane and hard tissue lesions can be caused by drugs, and that the incidence of these problems is increasing in elderly persons due to large numbers of drugs prescribed for these patients. Almost all drug-

induced lesions closely resemble naturally occurring diseases making differential diagnosis more difficult. Therefore, the successful diagnosis and management of drug-induced diseases of the oral cavity is largely dependent on keen clinical observation and an accurate history.

REFERENCES

- Almeyda J, Baker H. Drug Reactions XII. Cutaneous reactions to anti-rheumatic drugs. *Br J Dermatol* 1970; 83: 707-11.
- Angelopoulos AP. Diphenylhydantoin gingival hyperplasia. A clinicopathological review. 2. Etiology, pathogenesis, differential diagnosis and treatment. *J Canad Dent Assoc* 1975; 41: 275-7, 283.
- Bottiger LE, Strandberg I, Westerholm B. Drug induced febrile mucocutaneous syndrome. *Acta Med Scand* 1975; 198: 229-33.
- Brady ES. Drugs and the elderly. In: Davis RH, Smith WK, eds. *Drugs and the Elderly*. Los Angeles: University of Southern California Press, 1974. 1-6.
- Burket LW. Pigmentation of the oral tissues. In: *Oral Medicine*, 7th Edition. Philadelphia: J. B. Lippincott Co. 1977. 115-29.
- Chisholm DM, Ferguson MM, Jones JH, Mason DK. Introduction to oral medicine. London: W. B. Saunders Company, 1978: 143-4.
- Conchie JM, Monroe JD, Anderson DO. The incidence of staining of permanent teeth by tetracyclines. *Canad Med Assoc J* 1970; 103: 351-6.
- Crane GE. Tardive dyskinesia in patients treated with major neuroleptics: A review of the literature. *Am J Psychiat* 1968; 124: 40-8.
- Desai RG. Pigmentation after busulfan therapy. *New England J Med* 1965; 272: 808-9.

10. Duxbury AJ. Contact Hypersensitivity. In: Jones JH, Mason DK, eds. Oral manifestations of systemic disease. Philadelphia: W. B. Saunders Company, 1980: 456-7.
11. Duxbury AJ. Salivary gland enlargement and pain. In: Jones JH, Mason DK, eds. Oral manifestations of systemic disease. Philadelphia: W. B. Saunders Company, 1980: 470-1.
12. Erikson HM, Gjermo P. Incidence of stained tooth surfaces in students using chlorhexidine-containing dentifrices. *Scand J Dent Res* 1973; 81: 533-7.
13. Ettinger RL. Xerostomia—A complication of aging. *Aust Dent J* 1981; 26: 365-71.
14. Fisher CR. Differences by age groups in health care spending. *Health Care Finance Rev* 1980; 1: 65-909.
15. Glick LG, Chaffee RB, Salkin LM, Vandersall DC. Oral mucosal chemical lesions associated with acetylsalicylic acid: two case reports. *N Y State Dent J* 1974; 4: 475-8.
16. Hay DD, Reade PC. Methyldopa as a cause of oral mucous membrane reactions. *Br Dent J* 1978; 145: 195-203.
17. Henkin RI, Graziadei PPG, Bradley DF. NIH Clinical Staff Conference: the molecular basis of taste and its disorders. *Ann Intern Med* 1969; 71: 791-821.
18. Hjeljord LG, Rolla G, Bonesvoll P. Chlorhexidine-protein interactions. *J Periodont Res* 1973; 8: 11-6 (Suppl. 12).
19. Horler AR. Blood disorders. In: Davis DM, Textbook of adverse drug reactions. London: Oxford University Press, 1977. 354-64.
20. Horsfeld P, Logan FA, Newey JA. Oral irritation and gentian violet. *Br Med J* 1976; 11: 529.
21. Jackson D, Surcliffe P. Clinical testing of a stannous fluoride-calcium pyrophosphate dentifrice in Yorkshire school children. *Br Dent J* 1967; 123: 40-8.
22. Jaffe IA. Effects of penicillamine on the kidney and taste. *Postgrad Med Sci* (October Suppl.): 1968: 15-8.
23. Kamen, S. Tardive dyskinesia—A significant syndrome for geriatric dentistry. *Oral Pathol* 1975; 39: 52-7.
24. Kasper JA, Rossiter LF, Taylor AK, et al. Expenditures for personal health services: Findings from the 1977 national medical care expenditure survey. Paper presented to the 108th annual American Public Health Association meeting. Detroit, MI, October 21, 1980.
25. Kennett S. Stomatitis medicamentosa, due to barbiturates. *Oral Surg, Oral Med Oral Pathol* 1968; 25: 351-6.
26. Klein F. Hypotensive Drugs. In: Meyler L, Herxheimer H. eds. Side effects of drugs, Vol 7 Amsterdam: Excerpta Medica 1972: 297.
27. Lauciello F, Appelbaum M. Prosthodontic implications of tardive dyskinesia. *N Y State Dent J* 1977; 43: 214-7.
28. Lehnert WRG. Iatrogenic oral candidosis. *Br J Dermatol* 1970; 83: 161-6.
29. Levantine A, Almeyda J. Drug induced changes in pigmentation. *Br J Dermatol* 1973; 89: 105-10.
30. McArroy BR. Mouth ulceration and slow release potassium tablets. *Br Med J* 1974; IV: 164-5.
31. Moffitt JM, Cooley RD, Olsen NH, Heferran JJ. Prediction of tetracycline-induced tooth discoloration. *J Am Dent Assoc* 1974; 88: 547-52.
32. Naylor MH, Einslie RD. Clinical testing of stannous fluoride and sodium monofluorophosphate dentifrices in London school children. *Br Dent J* 1967; 123: 17-23.
33. Odds FC. Candida and candidosis. Leicester: Leicester University Press, 1979. 75-91.
34. Schwartz D, Wang M, Zeitz L, et al. Medication errors made by elderly, chronically ill patients. *Am J Public Health* 1962; 52: 2018-29.
35. Silverman S, Lozada F. An epilogue to plasma-cell gingivostomatitis (allergic Gingivostomatitis). *Oral Surg* 1977; 43: 211-7.
36. Sotaniemi E, Kreus KE, Kaipainen WJ. Pigmentation and oral contraceptives. *Br Med J* 1968; 11: 120.
37. U.S. Government Printing Office. Part IV Health. In: Developments in Aging. A report of the Special Committee on Aging, United States Senate (Vol. 1). Washington, D.C. 1982.
38. Vogel RI, Deasy MJ. Extrinsic discoloration of the oral mucosa. *J Oral Med* 1977; 32: 14-6.
39. Vogel RI. Intrinsic and extrinsic discoloration of the dentition (a literature review). *J Oral Med* 1975; 30: 99-104.
40. Walton JG. Dental Disorders. In: Davis DM, ed. Textbook of adverse drug reactions. London: Oxford University Press, 1977: 124-33.
41. Weiss JI. Thrombocytopenis purpura: the dentist's responsibility. *J Amer Dent Assoc* 1973; 87: 165-8.

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Prospectus on Elderly Population in North Carolina

James S. Whaley¹

¹Mr. Whaley is on the staff of the National Association of Station Units on Aging located in Washington, D.C. Prior to this position, he was associated with the N.C. Division on Aging.

INTRODUCTION

One of the challenges confronting both the health care system and the social services system is meeting the needs of a growing older adult population. This growth is occurring during a time of little or no expansion in public funds to assist in the provision of needed health and social services.

Both nationally and in North Carolina, the fastest growing segment of the population is the older adult population. The North Carolina Office of State Budget projects the state's total population will increase by 1,123,602 persons (19 percent) between 1980 and the year 2000. During this same time period, it is projected that the age 65 and older population will increase by 335,201 persons (56 percent), the 75 and older population by 210,548 persons (98 percent), and the 85 and older population by 57,647 persons (128 percent). In 1900 the age 85 and older population in the United States represented 4 percent of the older adult population and 0.2 percent of the total population. By 1980 the age 85 and older group represented 10 percent of the older adult population and 1.0 percent of the total population. The projections for the year 2050 are that the age 85 and older population will repre-

sent 24 percent of the older adult population and 5.2 percent of the total population.

NC Popular Retirement Area

A part of this increase of the older adult population is due to older adults migrating to North Carolina from other states. North Carolina has become a popular retirement area. The number of persons over age 60 moving to North Carolina has quadrupled during the last 20 years. In 1960, North Carolina ranked 27th in the nation in the number of immigrants over age 60. In 1980, North Carolina was ranked 7th. During the period 1975-80, 2.37 percent of all persons over age 60 who moved from one state to another moved to North Carolina. In 1980 38,396 persons or 4.59 percent of all persons over age 60 in North Carolina had moved to North Carolina between 1975 and 1980.

Health Care Improvements is Present

Most of the increase of the number of older adults is due to improvements in the health care delivery system. The reduction of the death rate for childhood diseases is particularly important as well as the reduction of the death rate of mothers during childbirth. Life expectancy at birth has increased between 1930 and 1980 from approximately 48

years to approximately 65 years for black males, from 49 to 74 years for black females, from 60 to 71 years for white males, and from 64 to 78 years for white females.

Life Expectancy Changes

One of the interesting changes in life expectancy has been the narrowing of the gap between white females and black females. The gap has also narrowed between white males and black males. While the gap between racial groups has narrowed, the gap between white males and white females as well as the gap between black males and black females has widened. Some researchers are now predicting that any significant increase in life expectancy will be a result of increasing the survival rate of diseases primarily affecting men.

Life expectancy has important consequences for both the health care and social services systems. Most older men, including those among the "old-old," live with their wives. Older women are more likely to be widows, particularly those women among the "old-old." Men are, therefore, more likely to have support within the home to meet their activities of daily living needs than women. Women are more likely to need support from outside the home to meet their activities of daily living needs. This help may range from transportation assistance to in-home health and social services to domiciliary or nursing home care.

NORTH CAROLINA POPULATION TRENDS

	1980	% + 1980 - 1990	1990	% + 1990 - 2000	2000	% + 1980 - 2000
65 +	603,181	31	789,029	19	938,383	56
75 +	215,594	47	317,141	34	426,142	98
85 +	45,203	46	65,996	56	102,850	128
0 +	5,881,766	10	6,492,836	8	7,005,368	19

Aging Overview

Often times when we think of older adults, the picture we have in our mind's eye is of a poor person in a nursing home. This is not an accurate picture. Less than 5 percent of all older adults reside in an institution. Of the remaining 95 percent only about 4 percent can be classified as being severely impaired.

Elderly Income Levels

While in North Carolina, the incidence of poverty is greater in the older adult population than in the general population, not all older people are poor. In 1979 in North Carolina, 143,557 or 23.8 percent of the persons over age 65 had incomes below the poverty level. This compares with 13.8 percent of those persons under age 55, 11.7 percent of the persons between ages 55 and 59, and 15.2 percent of the persons between the ages of 60 and 64. When we look at the national data for 1982, 15 percent of all older adults had incomes below the poverty level; as did 18 percent of all older women, 28 percent of older adults living alone, 42 percent of older blacks, and 66 percent of older black women living alone.

The median income in North Carolina for males over age 65 was \$5,095.00 in 1979, and the mean was \$8,364.00. The median income for females over age 65 was \$3,099.00; the mean being \$4,766.00. Of the males over age 65 with income in 1979, 27,128 or 11.8 percent had incomes over \$15,000.00 as did 12,983 (3.8 percent) of the females.

Family Structure Caused Changes

Another factor impacting upon the service needs of older adults is the change in the family structure. In past generations the working-wife was the exception. Families were not as mobile. Wives were often the care givers for elderly family members who lived in the home or at least nearby. The wife is no longer available in many instances to serve as care giver without a severe financial sacrifice for the family. With transient families, children and grandchildren may not be nearby to provide assistance when needed. The increasing number of single-parent families also impacts upon the ability of the family to provide care and support of its elderly members. Traditionally, the majority (73 percent) of the long-term care services

needed by an older adult has been provided by families and friends. The health status of the older adult is not the main factor leading to placement in a domiciliary or nursing home. Placement is more likely due to the absence of family, exhaustion of personal and/or family resources, or the over-accumulation of burden on existing family members.

Health Care System and Social Services System

As the 1990s approach, it is important that we see the interrelationships between the health care system and the social services system. Some believe that the distinctions between these two systems are gradually becoming less distinct and will eventually disappear.

One factor contributing to the blurring of the distinctions between the health care and social services system has been the change in the Medicare reimbursement system and other efforts to slow the growth of health care costs. These changes have had the result of encouraging health care providers to look to new areas to use their existing capacity for care and to generate new sources of revenue. Hospitals and nursing homes are increasingly providing in-home services such as homemaker-home health aide and home delivered meals. Physicians are increasingly seeing the need to be knowledgeable about community social services and the need to develop patient care plans which incorporate both medical and social services. One of the issues which may confront the system in the future may well be by whom the social worker and case manager will be employed—by a public sector agency or by a physician in private practice.

Workforce is also an important influence

Another factor which will influence the provision of services to older adults will be changes in the workforce and the change in the number of workers to retirees. These changes have the potential of creating funding problems for the Social Security system. The Social Security Administration predicts that the ratio of taxpayers to beneficiaries will have dropped from 3.2 in the early 1980s to 2.2 by 2025. In order to maintain the current level of Social Security benefits, the Social Security Administration projects the payroll taxes may have

to increase from the current 14 percent rate to 23 percent or more by the year 2050.

SUMMARY

Future Questions to be answered

In the future there will be more older adults than there are now. Older adults will make up a greater proportion of the population, and the "old-old" will be a greater proportion of the older adult population. You and I will be the older adults of the future. What our lives will be like will depend on how we as a state and as a nation decide to resolve these issues:

- What is the appropriate mix of sources for funding long-term care?
- What is the appropriate mix of services and by whom should the services be provided?
- How can existing services be better coordinated for increased effectiveness and efficiency?
- How can family and friends best be supported and have their ability to provide services to older adults enhanced?
- What changes will occur in the types of health care services needed by older adults?
- What can be done to effectively promote maintaining good health and preventing disability and illness? How can persons be motivated to maintain a healthy lifestyle throughout their lives?
- What are the appropriate roles for the public and private sectors in financing, delivering, and regulating health care?
- Can and should the health care costs of older adults be dealt with separately from the costs for the population as a whole? Can rationing of health care be avoided?
- How should health care research related to the elderly be balanced with regard to improving life expectancy and improving the quality of health?
- To what extent should government insure against catastrophic illness? Should it be different for older adults than for the population as a whole?
- How will the public define "a reasonable standard of living" for retirees?

Continued on page 29

Dental Care for the Aged — The North Carolina Dental Society Response

William Milner, D.D.S., M.P.H.¹

¹Dr. Milner is a public health dentist in Asheboro at the Randolph County Health Department and is Chairman of the North Carolina Dental Society Committee on Aging.

What do you get when you ask forty health care professionals to divide into seven subcommittees and develop dental geriatric programs for this state? A whole new way of doing things.

That is what happened with the North Carolina Dental Society (NCDS) Committee on Aging—a group that has a short and energetic history. It all started when the N.C. Committee for Dental Health (an advisory group for the Dental Section, N.C. Department of Human Resources) introduced a resolution in the 1983 NCDS House of Delegates calling for the formation of a task force to study dental geriatric issues. The resolution was adopted and NCDS President Dr. Robert Wilkinson appointed a group (note separate listing) which developed a plan of action approved by the 1985 House of Delegates. Since then, this whole process has received the unqualified support of NCDS 1984-85 President Dr. Robert Sugg and 1985-86 President Dr. Norman Grantham.

The report called for the formation of a permanent NCDS Committee on Aging which would address the following short- and long-range problems.

Short Term

Denture Labeling Promotion
Portable Care Delivery for Institutional and Homebound Care
Nursing/Rest Home and Home Health Programs
Senior Adult Center Programs

Long Range

Financing Care
Professional and Consumer Education
Research Stimulation

The resulting Committee on Aging (note separate listing) asked forty health care related professionals—not just dentists—to initiate programs in the

above seven areas. These people convened in August 1985 and have since been working independently as subcommittees to carry out goals. Their activities along with the subcommittee chairpersons are listed below:

EDUCATION

Ann Powell, R.D.H., M.Ed
Director of Educational Services
Bowman Gray School of Medicine
(919) 748-2167

The education group is developing a series of AHEC/NCDS sponsored seminars to help practitioners better treat the geriatric patient. They are studying current curricula in dental and hygiene schools—seeing that the needs of the current practitioner are incorporated into these training programs.

A December 12th seminar arranged by Dr. Steve Mackler and Ann Powell featured Dr. Saul Kamen, Dr. Marvin Block, and Dr. Betty King Sutton discussing "Future Trends in Dental Practice: Delivering Care to the Aging Population."

NURSING HOMES

Jim Parker, D.D.S.
Private Practice, Benson
(919) 894-8114

This subcommittee is working with nursing home administrators, dental consultants, and the N.C. Nursing Home Licensing Board to improve dentistry's involvement in these facilities. Pilot projects and training programs around the state will show dentists and hygienists how to work as a team—providing care and education services.

SENIOR CITIZEN CENTER

Jean Spratt, D.D.S., M.P.H.
South Central Regional Supervisor
Dental Section
(919) 486-1191

Senior Citizen Centers are a vital link to working with the elderly in each of our communities. This subcommittee is working with local Councils on Aging to establish a dental consultant position which will be responsible for regular in-center screening/referral programs and education activities. A recent Charlotte pilot project was a success and is now ready to be tried in other parts of the state.

DENTURE LABELING

Matt Wood, D.D.S., M.S., Chairman
Department of Removable
Prosthodontics
UNC School of Dentistry
(919)966-2754

This group has received a substantial discount on two denture labeling kits which will soon be available for purchase by dentists and nursing homes. Local dentists will be encouraged to label all existing and future appliances of their patients and be given education materials to promote this effort in their community.

FINANCING

Betty King Sutton, D.D.S., M.P.H.
Director, N.C. Dental Medicaid
(919) 733-2833

The Financing Subcommittee is studying short- and long-term programs to make dental care more affordable to all elderly. Loosening up Medicaid dental criteria and increasing third party utilization of services are just a few of the options being pursued.

PORTABLE CARE

Cleve Dunn, D.D.S.
Private Practice, Asheboro
(919) 629-1130

More than ever, dentists are exploring alternative ways to deliver care. The Portable Care Subcommittee is identifying dentists interested in providing such services as home and institutional care

and showing them how to use the most recent technology in these efforts. Courses and materials will be designed to make out-of-office dental care easy and economical.

RESEARCH

Gary Rozier, D.D.S., M.P.H.
Dept. of Health Policy and
Administration
UNC School of Public Health
(919) 966-2245

In the next few years we must learn a great deal about the dental needs of the young elderly and old elderly. Planning of basic surveys of dental needs, existing dental conditions, and elderly attitudes towards treatment are already underway by this subcommittee. Information supplied will help the practitioner provide better care now and help dentistry plan how to better serve this population in the future.

These activities involve numerous health care professionals working at both a state-wide and grassroots level. Many of the individual ideas have been successful in other states; however, only North Carolina is working to develop a comprehensive program. This is being done by one of North Carolina's strongest resources—networking. This networking concept is now establishing working relationships among the following organizations:

NCDS
North Carolina Health Care Facilities
North Carolina AHEC
Association of Non-Profit Homes for the Aged
UNC Schools of Dentistry and Public Health
North Carolina Association on Aging
Bowman Gray School of Medicine,
Department of Dentistry
Dental Section
North Carolina Dental Laboratory
Association
North Carolina Department of Human Resources
North Carolina Association for Home Care
North Carolina Division of Aging
American Association of Retired Persons
North Carolina Medicaid Section

Combining the efforts of the previously mentioned partners is making these projects a reality. The NCDS leadership

and its members have put in place the mechanism to make the quality of life for our elderly citizens far better.

Task Force Members

William Milner, D.D.S., M.P.H.,
Chairman
Randolph County Public Health Dentist
Marvin Block, D.D.S., M.P.H.,
Associate Professor

UNC School of Dentistry
Becky Bowden, M.P.H., Health
Educator
Department of Human Resources
Susan Caudell, R.D.H., Private
Hygienist
Ron Davis, Ph.D., Chief, Program Services Section
Division of Aging
Paul Doody, Assistant State Director
American Association of Retired Persons
Cleve Dunn, D.D.S., General Dentistry
John Hansel, D.M.D., M.S., F.A.C.P.,
Prosthodontist
Steve Mackler, D.D.S., P.A.,
Periodontist
Leah McKissick, D.D.S., M.P.H., Dental
Director

Wake County Health Department
Gary Rozier, D.D.S., M.P.H., Associate
Professor

UNC School of Public Health
Betty King Sutton, D.M.D., M.P.H.,
F.A.E.D., Dental Director

North Carolina Medicaid Program

COMMITTEE ON AGING

Cleve Dunn, D.D.S.
Private Practice, Asheboro
John Gouch, D.D.S.
Private Practice, Charlotte
William Milner, D.D.S., M.P.H.
Randolph County Public Health Dentist
James T. Parker, D.D.S.
Private Practice, Benson
Betty King Sutton, D.D.S., M.P.H.
Director, N.C. Dental Medicaid

Prospectus on Elderly Population in North Carolina

(continued from page 27)

- Can workers be expected to assume greater responsibility for their own retirement support?
- What proportion of retirement income should come from savings, investments, private pensions, and Social Security?

REFERENCES

1. American Public Welfare Association. *Coming Population Changes Both Good and Ill for Human Services*; Washington Report, Volume 18, Number 8, October 1983.
2. Bureau of the Census. *The Aging Population: A 1980 Census Workshop Seminar Notebook*, 1983.
3. Bureau of the Census. Table 234, *Income in 1979 of Persons by Age, Race, and Sex in North Carolina*.
4. Flynn, Cynthia B.; Longino, Charles F. Jr.; Wiseman, Robert F.; and Biggar, Jeanne C. *The Redistribution of America's Older Population: Major National Migration Patterns for Three Census Decades, 1960-1981. The Gerontologist*, Volume 25, No. 3, 1985.
5. North Carolina Office of State Budget. *North Carolina Population Projections*.
6. Taylor, Paul. *The Coming Conflict As We Soak the Young To Enrich the Old*, *The Washington Post*, Sunday, January 5, 1986.
7. *The Congressional Clearinghouse on the Future. Tomorrow's Elderly—Issues for Congress*, Congressional Institute for the Future.
8. United States General Accounting Office. *Conditions of Older People: National Information System Needed*, September 20, 1979.
9. U. S. Senate Special Committee on Aging and American Association of Retired Persons. *Aging American: Trends and Projections*, Second Printing, 1984.

UNC Receives A Geriatric Education Center Grant

The UNC-CH Geriatric Education Center (GEC), established by a three-year \$922,397 grant from the U.S. Department of Health and Human Services Bureau of Health Professions, is bringing dentists, physicians, nurses, pharmacists, health policy specialists, nursing home administrators, and social workers together for training through courses, seminars, institutes, and fellowships. The Center, headed by Dr. William G. Weissert, Director of the UNC-CH School of Public Health's Program on Aging, and Dr. Robert H. Fletcher of the UNC School of Medicine, is one of the largest of 20 such programs throughout the country. It is expected to educate approximately 246 faculty, professionals, and students toward a goal of increasing the number of health professionals and teaching faculty well trained in geriatric health and medical care. The Center's faculty are being drawn from the UNC Schools of Medicine, Nursing, Dentistry, Pharmacy, Social Work, and Public Health, as well as from Duke University's Center for the Study of Aging and Human Development, the Veterans' Administration Geriatric Research and Clinical Center, and North Carolina Central University, Department of Public Administration. Visiting scholars and specialists from around the country will also instruct.

Activities sponsored by the GEC will feature a core course in Geriatric Health and Medical Care offered each spring, a three-week summer institute, several short courses, and resident and non-resident fellowships ranging from a few days to one year. The 3-credit spring semester course will present a comprehensive survey of diseases affecting the elderly, including their definition, prevalence, treatment, and course, as well as a review of major public policies and practices affecting geriatric health and medical care.

Course topics include demography and dependency of the aged, biological aging, geriatric assessment, respiratory disorders, genitourinary disorders and incontinence, skin care, musculoskeletal disease in the elderly, falls in the elderly, clinical evaluation of mental dysfunction, depression, dental health of the aged, pharmacology and the aged, hos-

pitals, nursing homes and the aged, home and community care, case management, care giver burden, helping family caregivers, minority issues, ethical decisions at the end of life, and health promotion/disease prevention.

The course is open to graduate students and faculty in the health sciences and other allied health professions as well as practicing professionals from all health disciplines and social work. Two full-time faculty members in the School of Dentistry took the multi-disciplinary course this past Spring.

In addition to the core course which will be repeated in the Spring of 1987, a three-week summer institute is being offered stressing didactic and clinical experience in geriatric health care, medicine, and health policy issues. The institute will be open to physicians from anywhere in the country who have full-time faculty positions in a family practice and are members of the Society for Teachers of Family Medicine, as well as internal medicine residency training participants at an in-state school other than UNC. At least six physicians will be trained each year, three of whom also will be part-time fellows for nine months.

Further geriatric study is provided by individual UNC Schools where each concentrating on their particular clinical specialty. The UNC School of Dentistry

will be sponsoring two one-day continuing education courses presenting medical and social aspects of geriatric dental treatment. These courses will be presented through the North Carolina Area Health Education Centers to practicing dentists and dental auxiliaries during the first year of the project. Up to 20 dental practitioners are expected to enroll. The first course was held March 1986; the second will be scheduled October 1986.

In support of the activities of the School of Public Health on Aging, an up-to-date library of more than 600 articles and several dozen books on health care of the aged has been assembled. For the UNC-CH GEC, this library will be expanded to include articles and selected books on geriatric nursing, geriatric pharmacy, geriatric dentistry, and articles related to teaching health professionals about geriatric care. This expanded collection of relevant material will form the basis of an Information Clearinghouse and Resource Center, the first of its kind in North Carolina. These materials will be made available to GEC faculty, to faculty-trainees, and to faculty-trainee alumni so that as new material becomes available, it will be accessible to health professions in North Carolina.

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March 20, 1987

Essential Clinical Techniques for Treating Periodontal Disease — Scaling and Root Planing,*

Sponsored by the Department of Periodontics, Faculty: Dr. Len Jewson and Dr. John Moriarty, Cost: Dentists \$125, Credit: 7 hours, Synopsis: Research and clinical experience have shown that proper root preparation utilizing curettes to debride the roots of periodontally involved teeth promotes healing. These basic procedures include scaling and root planing which eliminate bacterial plaque, calculus deposits as well as toxic waste products of bacteria on the root surface. Bacterial products cause continued periodontal inflammation which leads to further loss of the periodontium. Much of the periodontal disease seen in the general practitioner's office could be controlled by these debridement methods. The course is designed to reorient the general practitioner to the clinical techniques of scaling and root planing and the rationale for these modalities. The course will also stress examination, patient classification, establishment of baseline data, and selection of appropriate therapy. The course will consist of two sections: a didactic portion and a laboratory session where the techniques of scaling and root planing with conventional and ultrasonic instruments will be practiced and evaluated along with instrument sharpening methods.

March 27, 1987

Periodontal Implications in the Treatment of the Orthodontic Patient,

Sponsored by the Department of Periodontics, Guest Speaker: Dr. Robert Vanarsdall of the Department of Orthodontics and Periodontics, University of Pennsylvania School of Dentistry, Cost: Dentists \$135, Auxiliaries \$75, Credit: 7 hours, Synopsis: This course is designed to review the most recent findings and studies regarding periodontal diseases that are essential knowledge for all practitioners involved in the treatment of periodontal and orthodontic patients. Emphasis will be placed upon correction

of periodontal problems through orthodontic treatment as well as prevention of adverse periodontal responses that may occur. Characteristics of the high risk patient will be described. Prevention of mucogingival problems will be examined along with an indepth overview of the management of ectopically positioned and unerupted teeth.

March 28, 1987

The Last Word on Cross Infection Risks and Operatory Asepsis,

Sponsored by the Department of Endodontics, Faculty: Dr. James Crawford, Cost: Dentist \$75, Auxiliaries \$25, Office Group \$75, Credit: 4 hours with option for 2 more hours, Synopsis: This course has been presented nationwide and is of special value to those wanting to upgrade their office asepsis program to meet current infection risks. It should prepare participants to develop an ongoing asepsis program for their office and to construct a manual for their office use. Methods of protection presented will include: immunizing personnel against hepatitis B and other diseases; improving patient screening, personal protection, and efficiency and effectiveness of surface protection and instrument sterilization; controlling infection hazards created by dental unit water systems; special management of known infectious patients. An optional discussion and problem-solving period as well as a clinical hands-on period on operatory disinfection will follow the lecture.

APRIL

April 3, 1987

The Use of Posterior Composites in Children, Adolescents, and Adults: A Symposium on Clinical Applications,

Sponsored by the Departments of Operative Dentistry and Pediatric Dentistry, Faculty: Dr. Stephen Bayne, Dr. Al Wilder, Dr. Dave Brunson, Dr. Diane Dilley, and Dr. Ted Oldenburg, Cost: Dentists \$120, Auxiliaries \$50, Credit: 7 hours, Synopsis: In an effort to update dental practitioners on all current aspects of posterior composite restora-



tions, noted speakers and researchers from the Departments of Operative Dentistry and Pediatric Dentistry will provide a series of presentations in a symposium format. Topics will include an overview of commercially available products, glass ionomers, dentin bonding, new related instruments, as well as an indepth view regarding what constitutes the "ideal" posterior composite restoration. Particular attention will be given to the clinical applications of these materials in both young and adult populations including step-by-step procedural descriptions. Comprehensive research findings will be presented as well as exciting new ultra-comprehensive techniques involving preventive resin restorations and sealants.

April 4, 1986

Optional Participation Session*,

Sponsored by the Department of Operative Dentistry, Faculty: Dr. Harald Heymann, Dr. Al Wilder, and Dr. Dave Brunson, Cost: Dentists \$75, Credit: 3 hours, Synopsis: This optional participation session will involve utilizing the materials and techniques presented in the previous day's program. Approximately \$75 worth of materials will be given to each registered participant.

April 24, 1987

Rationale for Surgery in Periodontal Therapy,

Sponsored by the Department of Periodontics, Faculty: Dr. L. H. Hutchens, Jr. and Dr. Ike Aukhil, Cost: \$110, Credit: 7 hours, Synopsis: Recent research evidence has altered traditional ideas about the need and effectiveness of periodontal surgery in the treatment of moderate to severe forms of periodontal disease. This course is designed to update the practitioner on the rationale for selection of the patient for whom surgery is indicated and to illustrate the appropriate surgical techniques as they relate to clinical findings. Furthermore, this course is intended primarily for the practitioner who is actively treating periodontal patients and wishes to be

current in the concepts and techniques that involve the use of synthetic bone implants, mucogingival surgery, gingival grafting, and methods to surgically facilitate restorative dentistry. Matters of mutual concern to the general practitioner and the periodontist in combined patient care will be discussed. Post-operative care and maintenance will be emphasized.

MAY

May 8, 1987

Third Annual R. J. Shankle Lecture,

Sponsored in conjunction with the Department of Endodontics, Guest Speaker: Dr. Calvin D. Torneck of the University of Toronto, Cost for Lecture and Luncheon: \$25, Credit: 4 hours, Synopsis: Injuries to the developing permanent dentition can often give rise to complex changes in tooth form which can cause difficulties in endodontic management of these teeth should such treatment become necessary. Understanding the nature and significance of such injuries is essential to making proper decisions in the choice of when to treat them and in selecting the most favorable treatment mode. In the course of this presentation the dynamics of human root development will be described and discussed. Particular emphasis will be placed on the interaction of these dynamics with conventional treatment modalities in endodontic practice. Included in the presentation will be a consideration of how endodontic treatment is influenced in cases of pulp calcification, altered root shape,

horizontal root fracture and root resorption. Particular attention will be given to the chances for treatment success and root retention. The presentation will end with a discussion of endodontic apexification. It is designed to be of interest to generalists and dental specialists, in particular those who treat the child and adolescent patient on a routine basis, and will establish a biological basis for treatment decisions as well as describe the types of treatment currently advocated in patient management.

SPECIAL OFFERINGS

London and Paris, June 26 - July 7, 1987.

Presented by the Office of Institutional Development and the UNC Dental Alumni Association. Departure from Atlanta is scheduled on June 26, 1987, with arrival in London on the 27th. Four nights accommodations have been arranged at the Cumberland Hotel, a first class hotel located on Oxford Street convenient to Hyde Park, Marble Arch and Harrods! Our journey to Paris will be by Hovercraft crossing of the English Channel. We will spend four nights in Paris at the Concorde-St. Lazare, a traditional old first class hotel adjacent to St. Lazare station and within walking distance of the Opera and "Grand Boulevards" of Paris. The cost of the package is \$1650.00 per person double occupancy and includes eight nights accommodations with private bath, full English breakfast daily while in London and continental breakfast daily while in

Paris, services of local coaches and guides, airport transfers, portage, medieval banquet at Hatfield in London, dinner at a local restaurant in Paris, half day tour of London's West End, half day tour of Windsor Castle and a half day city tour of Paris. All taxes are included. The cost for the continuing education is \$175.00 for dentists and \$125.00 for non-dentists. The program schedule is now being developed. Details will be available upon request. Questions, contact Ms. Prissy Allen, 800/722-1355 (NC) or 919/966-4563.

Fourth Annual Dental Review — Come Learn at the Beach!

Presented by the Department of Operative Dentistry, June 17-20, 1987, Location: Ocean Dunes Resort and Villas, Myrtle Beach, S.C., Cost: Dentists \$150.00, Auxiliaries \$85.00, Credit: 14 hours, Synopsis: This course will provide information on a variety of exciting topics.

Mini-Residency Opportunities, The UNC School of Dentistry offers a unique opportunity for a more concentrated and individualized learning experience through the mini-residency program. This program provides practitioners with the opportunity for individualized supervision by faculty instructors in clinical, laboratory and classroom settings. Contact the Office of Continuing Education for information on mini-residencies in the following departments: Endodontics, Oral Diagnosis, Pediatric Dentistry and Periodontics.

**course unavailable for student participation*

Application Form (*Social Security Number must be included)

Please enroll me in the following course(s):

Course Title	Course Date	Registration Fee	Amount Enclosed
1) _____	on _____	_____	_____
2) _____	on _____	_____	_____

Name _____ *SS# _____

Address _____ City _____

State _____ Zip _____ Office Phone (____) _____

County (if N.C.) _____ Occupation _____

List additional personnel attending and give course date:

1) _____ 2) _____

*SS# _____ *SS# _____

Date _____ Date _____

Fee _____ Fee _____

Occupation _____ Occupation _____

(Make checks payable to UNC School of Dentistry and mail to Continuing Dental Education, 410 Brauer Hall 211H, School of Dentistry, Chapel Hill, NC 27514.)

Application Form (*Social Security Number must be included)

Please enroll me in the following course(s):

Course Title	Course Date	Registration Fee	Amount Enclosed
1) _____	on _____	_____	_____
2) _____	on _____	_____	_____

Name _____ *SS# _____

Address _____ City _____

State _____ Zip _____ Office Phone (____) _____

County (if N.C.) _____ Occupation _____

List additional personnel attending and give course date:

1) _____ 2) _____

*SS# _____ *SS# _____

Date _____ Date _____

Fee _____ Fee _____

Occupation _____ Occupation _____

(Make checks payable to UNC School of Dentistry and mail to Continuing Dental Education, 410 Brauer Hall 211H, School of Dentistry, Chapel Hill, NC 27514.)



AHEC Notes

AHEC—School of Dentistry C.E. Courses

"Antibiotic Coverage in the Medically Compromised Patient"

March 19, 1987
Fayetteville AHEC
Location: TBA
Dr. William Webster
6:30-9 p.m. with dinner

"Current Concepts in Perio Therapy"

March 27, 1987
Greensboro AHEC
Location: Greensboro AHEC
Dr. L. H. Hutchens
1-5 p.m.

"Radiographic Interpretation"

March 28, 1987
Wake AHEC
Location: Wake AHEC
Dr. Steve Matteson
1:30-4:30 p.m.
Greater Raleigh Dental Hygiene Society

"Update in Pathology"

March 28, 1987
Wake AHEC
Location: Wake AHEC
Dr. Jeff Burkes
9 a.m. - 12 noon
Greater Raleigh Dental Hygiene Society

"Porcelain Shoulder Crown; Etched Porcelain Laminate Veneers"

April 3, 1987
Charlotte AHEC
Location: CAHEC Classroom
Drs. Dave Felton and Van Haywood
1-2:30; 3-4 p.m.

"Molar Endo"

April 10, 1987
Northwest AHEC
Location: Bowman Gray School
of Medicine
Dr. Joel Leeb
9 a.m. - 4 p.m.

"Update in Fluoride and Prevention"

April 17, 1987
Wilmington AHEC
Location: Wilmington AHEC
Dr. James Bawden
1-4 p.m.

"Current Partial Denture Design: An Overview"

April 24, 1987
Greensboro AHEC
Location: GAHEC
Drs. Ray McArthur and Don Nelson
9 a.m. - 5 p.m.

"Dental Auxiliary Utilization"

May 15, 1987
Fayetteville AHEC
Location: TBA
Dr. Doug Strickland
1-5 p.m.

"Update on Fluoride and Prevention"

May 15, 1987
Greensboro AHEC
Location: Greensboro AHEC
Dr. James Bawden
1-4 p.m.

"Current Concepts in Clinical Dental Hygiene"

May 22, 1987
Wilmington AHEC
Location: Wilmington AHEC
Ms. Kathie Morr
Time TBA

"Overdentures, Indications, and Precision Attachments"

June 3, 1987
Mountain AHEC
Location: MAHEC
Dr. Kent Healey
4-9 p.m.

"Utilization of Magnets for Retention ...; Treatment Partial and Complete Dentures"

June 5, 1987
Charlotte AHEC
Location: CAHEC Classroom
Drs. Matt Wood and Don Nelson
1-3; 3:15-5:15 p.m.

"Intraoral Functions"

June 6, 1987
Fayetteville AHEC
Location: FTI
UNC Dental Assisting Faculty
9 a.m. - 4 p.m.



Dental Foundation of North Carolina highlights



Dr. Robert B. Litton



l to r: Dr. Litton presents Dr. Fred Howdy a certificate of appreciation of service.

Development Update

Record Year in Donations

In many ways 1985-86 was a significant year for the Dental Foundation. In total assets the Dental Foundation has surpassed the \$2 million mark. Assets on June 30, 1985 were \$1,420,348. This year a fund balance of \$2,113,492 was reported. Not only is this a significant increase, but it marks an important milestone for the Dental Foundation of North Carolina.

Part of this increase came from major gifts in excess of \$100,000 each. It also represents a number of new contributors to the Dental Foundation. Total income for the year including interest income was \$1,338,227.

The increase in principal did not come entirely from not spending the assets of the corporation. In fact, this past year saw \$547,967 spent directly in gifts,

grants and awards for the operation of the School of Dentistry and the Dental Foundation and its various programs. Also spent was another \$97,000 in fundraising, management and general expenses. While this figure has gone up some in the past years, the extra expenditure is more than justified by the dramatic increase in income to the Foundation.

The work of the Dental Foundation is more important than ever before as the profession of dentistry addresses the turbulent issues of our time. The resources to make these contributions are increasingly important. Thank you to all who made this record year possible, especially Dr. D. C. Chandler who served as the 1985-86 Campaign Coordinator.

Dental Foundation Annual Meeting and Luncheon Held

The Dental Foundation of North Carolina, Inc. held its annual business meeting in Chapel Hill at the Carolina Inn on Thursday, December 4, 1986. Officers elected during this meeting were Dr. Robert Litton, Shelby, President; Dr. Smith Jewell, Wilmington, President-Elect; Dr. John Olmsted, Greensboro, Vice-President; Dr. Webb McCracken, Sanford, Secretary-Treasurer; and Dr. Ben Barker, Chapel Hill, Assistant Secretary-Treasurer. Directors elected include Dr. Kenneth Auman of Lexington, Dr. D. Gregory Chadwick of Charlotte, Dr. George Sutton of Morehead City, and Dr. Heber Windley of Zebulon. Dr. Chadwick and Dr. Windley were also elected to membership on the Executive Committee. Dr. Keith Bentley will represent the UNC Dental Alumni Association; Dr. David Freshwater, the North Carolina Dental Society; Ms. Pam Short, the

North Carolina Dental Hygienists' Association; and Ms. Lynn Strickland, the North Carolina Dental Assistants' Association. A representative for the North Carolina Dental Laboratory Technicians' Association has not been identified.

The Annual Luncheon, in conjunction with the Thirty-Second Annual Dental Seminar Day activities, was held at the Banquet Hall of the Morehead Building on the University of North Carolina at Chapel Hill campus. The Clef Hangers, a musical group of undergraduate students at the University, provided the entertainment. Dr. Fred Howdy of Washington was presented a certificate of appreciation for service as President by Dr. Litton and was cited for his leadership and continued support of the Dental Foundation and the UNC School of Dentistry as well as the dental profession.

The Pew National Dental Education Program Makes Awards

The Pew National Dental Education Program has selected twenty-one institutions for Phase I of its five-year project to work with dental education programs in the nation. The project, started in 1985, seeks to assist dental schools in making strategic shifts to accommodate themselves to the dramatic changes which are occurring in the health care, and in particular the dental health care environment.

The selected institutions are University of Alabama, Boston University, University of California at San Francisco, Columbia University, University of Connecticut, Creighton University, University of Florida, Georgetown University, University of Iowa, University of Maryland, Meharry Medical College, University of Michigan, University of Missouri, New York University, Oregon Health Sciences University, University of Southern California, University of Tennessee, University of Texas Health Science Center at San Antonio, Virginia Commonwealth University, University of Washington, and West Virginia University.

In this first phase of the undertaking these schools will receive a grant of up to \$100,000 for a two-year period to assist them in incorporating strategic planning mechanisms into their management structures. In addition to the project grant the program will also sponsor

a series of management/development training seminars for faculty and administrative leaders within the selected schools. A number of other activities are planned for those institutions which did not receive a grant.

Commenting on the program, Dr. Ben Barker, Co-Director of the program and Dean of the UNC School of Dentistry indicated that "these are very turbulent times for dentistry and dental education. Like many other sectors of our society we have developed a great capacity for the training of new dentists. However, changes in the way that dental care is delivered and financed and important changes in dental disease patterns mean that we need to redirect some of our efforts to other types of activities."

Phase II of the program will begin in approximately one year and will provide assistance for five to seven schools at a level of up to one million dollars. Grants awarded during the second phase of the program will be to enable selected schools to implement those innovations which emerge during Phase I.

The Pew National Dental Education Program is supported by The Pew Memorial Trust in Philadelphia, Pennsylvania. The 8.7 million dollar grant marks an effort on the part of the Trust to provide resources to address fundamental issues confronting the health professions.

Dental Foundation of North Carolina, Inc.

In grateful recognition of the general contributions, the Dental Foundation of North Carolina, Inc. and the UNC School of Dentistry presents the following membership categories for 1986-87. Credit and appreciation must go to these people and corporations for this successful effort. (Club membership is based on contributions from July 1, 1985 through June 30, 1986.)

DISTINGUISHED SERVICE CLUB membership is awarded to contributors whose annual gifts exceed \$1,000.

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Mr. G. Randolph Babcock	Dr. Martha Ann Keels
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Dr. Frederick C. Shaw
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Dr. Clarence Foy Sherman
Dr. Irvin Bruce Sherran
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Dr. Hudson Wilson Shoulers Jr.
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Dr. Hugh Edward Suthpin
Dr. Daniel Samuel Tedder
Dr. Foy Lee Templeton Jr.
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Dr. Philip Winston Thomas
Dr. Thomas Neil Triplett
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Dr. Myron R. Tucker
Dr. James Anthony Vacca
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Dr. Daniel Samuel Tedder
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Dr. Thomas Neil Triplett
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Dr. George Elder Waynick Jr.
Dr. Spurgeon W. Webber Jr.
Dr. Alan Robert Weinstein
Dr. Don M. Wheelis
Dr. James Alan Whitehurst
Dr. Donald Edgar Whitworth Jr.
Dr. Bryant Kell Wicker
Dr. Bernard Wilkie
Dr. Saunders Winston Moore
Dr. Guy R. Willis
Dr. Herbert Smith Wilmer
Dr. George Curtis Wilson
Dr. Noah Rouse Wilson Jr.
Dr. Robert Woodrow Wilson
Dr. Edward K. Wright Jr.
Mr. John A. Yeager
Dr. Robert Howard Young
Dr. Eugene Fields Yoder
Mr. Mary Paula Zaytown
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Dr. David H. Becker
Dr. Perry Hampton Beeson Jr.
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Dr. Henry Milton Best III
Dr. Clarence F. Bidix
Dr. Jeffery David Billings
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Dr. Doris Jean Black
Dr. Howard White Blair
Dr. Mott P. Blair
Dr. William Charles Blair
Dr. Henry Christopher Blake III
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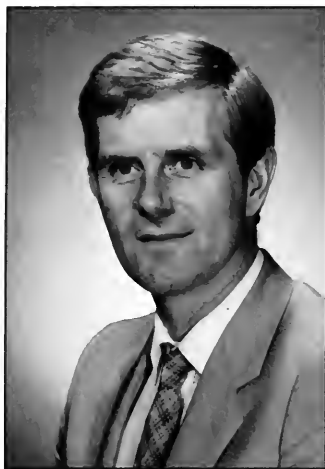
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Jacob B. Freedland Professor of Endodontics Named



Dr. Gunnar Bergenholtz

Ben D. Barker, Dean of the School of Dentistry at the University of North Carolina at Chapel Hill, recently announced the appointment of Dr. Gunnar Bergenholtz as the first Jacob B. Freedland Professor of Endodontics in the School of Dentistry.

The Chair honors Charlotte practitioner, Dr. Jacob B. Freedland, a part-time faculty member of the UNC School of Dentistry since 1964. A recognized leader in dental health care throughout North Carolina and the nation, Dr. Freedland has served as Director of the American Board of Endodontics, Director of the American Academy of Dental Practice Administration and President of the American Institute of Oral Sciences. He also received the Distinguished Alumnus Award from the University of North Carolina at Chapel Hill in 1979, and currently serves as Consultant for Education in Geriatric Dentistry with the Charlotte Area Health Education Center.

Chancellor Christopher C. Fordham III of the University of North Carolina at Chapel Hill said, "The establishment of the Jacob R. Freedland Professorship is a tribute to a great man who has made a significant contribution to this Univer-

sity, and to the dental health of the citizens of this state and nation. I am delighted with the appointment of Dr. Gunnar Bergenholtz as the first holder of this honor and look forward to the achievements that Dr. Bergenholtz will undoubtedly make through the Chair."

Dr. Bergenholtz has been on the faculty of the School of Dentistry since 1984 when he was appointed Professor and Chairman of the Department of Endodontics. Educated in Sweden, where he later served as Chairman of the Department of Oral Diagnosis, Faculty of Odontology at The University of Gothenburg, "Bergenholtz has brought a new vision to the Department and School of Dentistry. He has organized and implemented a departmental research program, established the R. J. Shankle Lecture Series, and reshaped the predoctoral program in dental pulp biology and endodontic therapy. He is a widely published scholar in his field," Barker said.

The Jacob B. Freedland Professorship was established through contributions from the Freedland family, and his many admirers and friends throughout the nation and the world.

Beck Appointed Chairman of Dental Ecology



Dr. Jim Beck

James D. Beck has been appointed Professor and Chairman of the Department of Dental Ecology in the School of Dentistry.

When making the announcement, Dean Ben D. Barker stated, "Jim Beck is arguably one of the nation's outstanding leaders, scholars, and teachers in community health. We expect his leadership both within and outside of the University to contribute significantly to the health and quality of life for all North Carolinians."

Beck formerly was Professor and Chairman of the Department of Preventive and Community Dentistry at the University of Iowa College of Dentistry.

Chapel Hill is a familiar place to Beck. The Chicago, Illinois native received his bachelor's degree in psychology from UNC in 1964, his master's degree in epidemiology from the UNC School of Public Health in 1967 and his doctorate from the University in 1969.

He lectured in the UNC School of

Social Work for a year before going to the University of Louisville in 1969 as an Assistant Professor of Community Dentistry. At Louisville, Beck also directed the Dental School Computer Center.

In 1972, he moved to the University of Kentucky to accept faculty appointments in the Departments of Community Dentistry, Community Medicine, and Behavioral Sciences.

From 1971 to 1974, Beck served as Director of Evaluation and Education, Acting Executive Director and Deputy of the Hunter Foundation for Health Care, Inc. As Deputy Director, Beck oversaw the administration of the foundation, a health maintenance organization.

In 1974, Beck went to Southern Illinois University as an Associate Professor in the Department of Health Systems Research and Director of Research and Evaluation.

Beck joined the University of Iowa

College of Dentistry in 1977 as Associate Professor of Preventive and Community Dentistry. He was named Chairman of the Department of Preventive and Community Dentistry in 1980.

Beck is President of the American Association of Public Health Dentistry, a member of the board of the American Society for Geriatric Dentistry, and a former President of the Behavioral Science Section of the International Association for Dental Research.

He is also a member of the American Public Health Administration, the Gerontological Society, the Society for Epidemiologic Research, the Behavioral

Scientists in Dental Research and the American Association of Dental Schools.

His main area of research is geriatric dentistry and dental epidemiology, a field in which he has published numerous articles. He has also served as a consultant to several national organizations including the Veterans' Administration Working Group on Geriatric Dentistry, the Division of Dentistry in the U.S. Department of Health, Education, and Welfare, and the Division of Dentistry for the United Auto Workers Prepaid Dental Study.

Simpson Named Chairman Department of Periodontics



Dr. David Simpson

Dr. David M. Simpson ('66) has been named Chairman of the Department of Periodontics at the UNC School of Dentistry. Dean Ben D. Barker made the announcement recently and said, "Dr. Simpson brings a wealth of leadership skills and energy to this Department, and I look forward to working with him to align the programs of the Department with the emerging strategic plans of the School."

Dr. Simpson received both his B.S. and D.D.S. degrees from the University of North Carolina at Chapel Hill. He then received his Certificate in Periodontology from the University of Washington where he later earned his Ph.D. in Experimental Pathology.

A native North Carolinian, Dr. Simpson returned to Chapel Hill in 1973 when he joined the faculty of the School of Dentistry as an Assistant Professor in the Department of Periodontics. He became an Associate Professor of that Department in 1976 and reached the rank of Full Professor in 1985. He has directed the graduate program in Periodontics since 1979, and his research has focused on histopathology and pathogenesis of periodontal disease and, most recently, wound healing of the periodontal tissue.

Dr. Simpson is married to Suzanne Landis Simpson and has two children, David and Laura.

Nesbit Presented Hunt Award

Dr. Samuel P. Nesbit, Associate Professor, Department of Oral Diagnosis at the UNC School of Dentistry, received the School's 1986 Richard F. Hunt Memorial Award for Excellence in Undergraduate Teaching.

The award was presented by Dean Ben D. Barker at the School's Spurgeon Awards Banquet.

The Richard F. Hunt Memorial Award is presented for significant contributions to excellence in undergraduate teaching. It is sponsored by the Loblolly Study Club of Rocky Mount in memory of its founder, Richard F. Hunt, a 1955 graduate of the UNC School of

Dentistry. The first award was presented in 1969.

While the recipient may be recognized for the quality of teaching service over a period of years, it is basically intended to recognize contributions during the year under review. Those honored have demonstrated "knowledge of subject matter, interest in students, a positive attitude toward work and scholarship and, above all, truth".

Nesbit is a graduate of Case Western Reserve University School of Dentistry. He received a Master of Science in Oral Diagnosis and Radiology from the University of Michigan. He is a member



Dr. Sam Nesbit

of Omicron Kappa Upsilon Honorary Dental Society and was the recipient of the Paul Gibbons Instructor of the Year

Radiology Consultation Service

The Section of Oral Radiology of the UNC School of Dentistry is pleased to offer a new service to the dental clinicians of our state. A radiology consulting service, patterned after the oral pathology biopsy service, is available to help evaluate and interpret radiographs presenting unusual or difficult diagnostic problems. The referring clinician may submit the radiographs along with a completed radiology consultation request which will include necessary demographic data and clinical history. The films will be reviewed by a member of the Section of Oral Radiology who will provide a written report that includes a radiographic interpretation, a differential diagnosis, and, if appropriate, recommendation for additional

Award in 1982 at the University of Michigan School of Dentistry.

radiographs or laboratory tests. The original films will be returned to the clinician along with the radiology report.

While this service is aimed primarily to help the dentist with difficult diagnostic problems, the Section of Oral Radiology is also available to help the clinician solve difficult or recurring technical problems. Clinicians may submit sample films that demonstrate the problem along with a "history" of the problem and in turn will receive a written report that provides a "differential diagnosis" of the problem and a series of recommended steps to correct the problem.

The fee for this service will be \$20.00. For additional information and consultation request forms contact: Dr. Mel L. Kantor, Section of Oral Radiology, UNC School of Dentistry 209H, Chapel Hill, NC 27514, (919) 966-2766.

UNC School of Dentistry Host Summer Minority Research Apprentice Program



Summer Apprentice Program Participants

Six North Carolina students spent the summer as Minority Research Apprentices at the UNC School of Dentistry. The six students were Audris Beasley of Cedar Grover, a student at Orange High School; Joli Faribault of Hillsborough, also a student at Orange High School; Alisa Hughley of Durham, a student at The School of Science and Math; Saju Joy of Durham, a student at Jordan High School; Wesley Schooler of Durham, a student at The School of Science and Math; and Patti Thompson of Hillsborough, a student at Orange High School. The faculty members with whom the students worked were involved in health-related research and were committed to developing in the students both understanding of the research in which they participate and the technical skills involved.

Through the School of Dentistry's Minority High School Research Apprentice Program, the 6 students worked in laboratories at the UNC Dental Research Center. In addition to hands-on laboratory work with faculty members, these students participated in career development seminars as well as research center seminars and were also

involved in portions of the summer college enrichment program for minority students thinking of careers in medical or dental professions. The selection process for the paid internship was a rigorous one and only 6 of the 22 program applicants were invited to participate.

Beasley and Schooler worked with Dr. Jacob Hanker on a project involving looking at blood smears and scoring them for enzyme activity after exposure to ionizing radiation. Faribault and Thompson worked with Dr. Duane Taylor and Dr. Steve Bayne on a project involving evaluating methods for using filling materials. Hughley worked with Dr. Jim Bawden on a project involving evaluating levels of fluoride in different tissues using 8-day old rat pups. Joy worked with Dr. James Coffey on research involving gathering protein assays on mice to see different concentration during the day.

The program gives the participants an opportunity to explore their career interests by interacting with faculty members in the School of Dentistry as well as conversing with dental students about the profession of dentistry. These

Faculty Updates

research experiences are teaching the students how to work efficiently in lab settings as well as strengthening laboratory skills. The research apprentices are seniors in high school and are in the process of making decisions about their selection of colleges to attend upon graduation.

Dr. Ken May, Director of the Admissions and Student Affairs at the School of Dentistry, and Dr. David McNair, Director of Counseling Services at the School of Dentistry are coordinating the program. "The purpose of the apprentice program," May comments, "is to stimulate a broader interest in minority high school students in careers in science.

Ability and scholastic accomplishment are important factors in the selection of students. Through participation in the program and exposure to many aspects of dentistry, we hope these students will develop an interest in pursuing a career in dentistry. The program is part of an overall effort to enhance minority presence in the School of Dentistry and minority representation within the state."

The 8-week program was funded by a federal grant from the Department of Health and Human Services for four of the apprentices, and a grant from The Howard University-Rockefeller Foundation Program for the other apprentices.

James D. Bader has received a joint appointment at the rank of Clinical Associate Professor in the Department of Health Policy and Administration. His primary appointment is as Research Associate Professor in the Department of Dental Ecology.

E. Dail Ballard has been appointed Clinical Instructor of the Departments of Medical Allied Health Professions (primary) and Dental Ecology (secondary).

James W. Bawden (Pediatric Dentistry) recently presented an AHEC Continuing Dental Education Course at the Greensboro AHEC entitled "Uptake of Fluoride and Prevention".

Richard A. Beane, Jr. has recently been appointed Clinical Associate Professor in the Department of Orthodontics. Beane is in private practice in Durham.

William B. Brunk ('71) (Ortho '73) has been appointed Clinical Assistant Professor in the Department of Orthodontics, and he practices in Raleigh.

Miles Crenshaw (Pediatric Dentistry/Research) recently presented lectures on the development of enamel at Forsyth Dental Center, McGill University, and the University of Montreal.

Adrian Lussi from the Department of Operative, Preventive, and Pediatric Dentistry at the University of Bern, Switzerland will be with Dr. Crenshaw in the Dental Research Center for the next 12-18 months as a Research Scholar. Dr. Lussi's visit is supported by the Swiss National Foundation for the Promotion of Research.

Dinae Dilley (Pediatric Dentistry) presented a program, "Traumatic Injury of Teeth and Oral Structures" to the Gateway Dental Study Club.

Gary J. Dilley (Ortho '83) has been appointed at the rank of Clinical Assistant Professor in the Department of Orthodontics. Dilley practices in Cary.

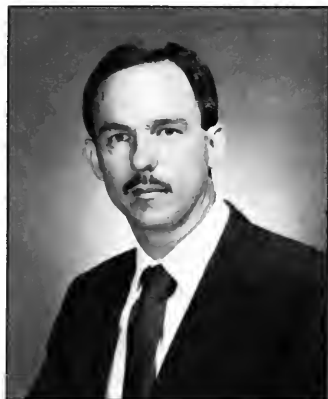
Judith A. Disney has been appointed Research Assistant Professor in the Department of Dental Ecology.

Carol Drinkard (Pedo '79) (Pediatric Dentistry) recently attended "The Regional Career Conference for the West" which was held at the University of California School of Dentistry in San Francisco. She chaired the Committee which organized the conference, the first of three regional career conferences co-sponsored by the Council of Faculties, American Association of Dental Schools, and the International College of Dentists. The day-long program was organized for dental students and recent dental graduates to provide information on a number of different career options including private practice, non-traditional practices, uniformed services, public health, academic dentistry, and research. There were more than 300 participants from the west coast dental schools. Dr. Drinkard also recently presented an AHEC Continuing Dental Education Course in Fayetteville entitled "Diagnosis and Treatment of Dental Trauma in Children".

George C. Dudley has been appointed at the rank of Adjunct Assistant Professor in the Department of Dental



Dr. Ronald J. Hunt



Dr. Richard Jordan



Dr. Sandra Madison

Ecology. His primary appointment as Adjunct Professor in the Department of Health Policy and Administration.

Henry W. Fields has received a promotion to the rank of Professor in the Department of Pediatric Dentistry.

Richard C. Graves has received a joint appointment at the rank of Clinical Associate Professor in the Department of Health Policy and Administration at UNC. His primary appointment is as Research Associate in the Department of Dental Ecology with a secondary appointment as Research Associate Professor in the Department of Epidemiology.

William H. Gurley, III ('71) (Ortho '81) has been appointed Clinical Assistant Professor in the Department of Orthodontics. Gurley is in private practice in Raleigh.

Herald O. Heymann ('78) (Operative Dentistry) has recently presented programs on "Conservative Esthetic Bonding: Materials and Techniques" for the Bowman Gray School of Medicine at a meeting in Myrtle Beach, SC; "Indirect Veneering Techniques with Composite Resins" to the American Academy of Esthetic Dentistry in Colorado Springs, CO; "Current Concepts in Conservative Esthetic Dentistry" to continuing education participants at the Walter Reed Army Hospital in Silver Springs, MD; and "Current Concepts in Veneering Techniques with Composite Resins" as well as serving as a panelist at the International Symposium on Laminate Systems in Philadelphia, PA.

Janet C. Holland (DH '74) (DATE '81) has been notified she will be appointed to the Rank of Clinical Assistant Professor in the Department of Dental Ecology effective January 1, 1988.

Ronald J. Hunt has recently been appointed Associate Professor in the Department of Dental Ecology. Dr. Hunt received his D.D.S. and M.S. in Community Dentistry and Dental Public Health at the University of Iowa College of Dentistry. His thesis was entitled "Diffusion of A Dental Innovation: Pit and Fissure Sealants". Prior to joining the faculty at UNC, he was Associate Professor in the Department of Preventive and Community Dentistry at the College of Dentistry at the University of Iowa. Hunt has successfully completed the certifying examination for the specialty of dental public health and is

now a diplomate of the American Board of Dental Public Health.

Richard D. Jordan ('72) (Pros '77) has recently received an appointment as Associate Professor in the Department of Removable Prosthodontics for a five-year term. Prior to joining UNC, he was Associate Professor in the Department of Fixed Prosthodontics at the University of Iowa. As a resident of UNC, he was a Maxillofacial Fellow. Jordan was formerly in private practice in Statesville.

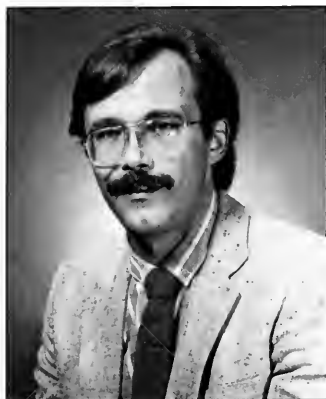
James D. Kaley ('68) (Ortho '70) has been appointed Clinical Assistant Professor in the Department of Orthodontics. He is in private practice in Greensboro.

R. Denby Lewis has been appointed at the rank of Clinical Associate Professor in the Department of Endodontics. He is in private practice in Danville, Virginia.

Sandra Madison ('78) has been appointed Assistant Professor in the Department of Endodontics. She received her B.S. in Dental Hygiene at the University of North Carolina at Chapel Hill as well as her M.P.H. and D.D.S. degrees. She participated in the General Practice Residency program at the Iowa City VA Medical Center in Iowa City, Iowa and received her Certificate and M.S. in Endodontics at the University of Iowa College of Dentistry. She became certified as a Diplomate of the American Board of Endodontics in 1985. Prior to joining the UNC faculty, she was Graduate Program Director and Assistant Professor in the Department of Endodontics at the College of Dentistry at the University of Iowa. She was in the private practice of Endodontics in Statesville, North Carolina in 1982-1983.

George Maryniuk has been appointed Assistant Professor in the Department of Fixed Prosthodontics. He received his D.D.S. degree from the University of Detroit and his Certificate in Prosthodontics at Tufts University School of Dental Medicine. He received a Robert Woods Johnson Scholarship for study at UCLA where he received his Masters in Public Health.

Walter T. McFall, Jr. ('58) (Periodontics) has been named the recipient of the 1986 Class of 1958 Distinguished Clinical Research Award. The presentation was made by a class member, Dr. **Bill Haltiwanger** of Rockingham. The



Dr. George Maryniuk



Dr. Al Morris



Dr. John Zuniga

purpose of the award is to recognize research conducted by a clinician faculty of the UNC School of Dentistry which has "the greatest potential for direct contributions to the practice of dentistry and dental health generally". The research must have been conducted primarily under the sponsorship of the UNC School of Dentistry. McFall's research was titled "Effectiveness of a Dentifrice Containing Formalin and Sodium Monofluorophosphate on Dental Hypersensitivity". The award was made during the recent annual luncheon of the Dental Foundation of North Carolina at the Morehead Building. These activities were held in conjunction with the UNC School of Dentistry's Thirty-Second Dental Seminar Deay. The first award was made in 1985.

Al Morris has joined the faculty of Dental Ecology as a Visiting Professor. Dr. Morris is from the University of Pennsylvania where he is Associate Vice President for Health Affairs and Government Relations. He is a Professor in Dental Care Systems in the School of Medicine, Professor of Oral Medicine, and Senior Fellow at the Leonard Davis Institute of Health Economics at the Wharton Graduate School. He is housed in the Health Services Research Center on the UNC-CH Campus and is Director of a Kellogg Foundation National Project on Development of Evaluation Methods for Dental Quality Assurance and Computer Applications in Dentistry.

Mark A. Odom (Endo '86) has recently received an appointment at the rank of Visiting Clinical Assistant Professor in the Department of Endodontics.

Theodore R. Oldenburg ('57) (Pedo '62) (Pediatric Dentistry) returned in August 1986 from a one-year sabbatical in Zurich, Switzerland. He enhanced his research activities in the laboratory of Dr. Felix Lutz and plans to continue his research activities at the UNC School of Dentistry.

Phillip R. Parker (Pedo '86) has been appointed Clinical Assistant Professor in the Department of Pediatric Dentistry.

Darlene H. Sams (DH '69) (DATE '72) has been appointed as Director Dental and Medical Continuing Education for Wake AHEC. She will continue to work with the School of Dentistry for 20% of her time on research and special projects

in the Office of Institutional Development. Effective January 1, 1988, she will be appointed Clinical Assistant Professor in the Department of Dental Ecology at the School of Dentistry.

Bill C. Terry (Oral Surgery) has completed his term of office as President of the American Board of Oral and Maxillofacial Surgery (ABOMS). The ABOMS is the certifying body for oral and maxillofacial surgeons. Currently 3,318 surgeons are registered as diplomates. Dr. Terry was recently the Guralnick Visiting Professor in Oral and Maxillofacial Surgery at the Harvard University School of Dentistry and Massachusetts General Hospital. The Professorship honors Dr. Walter Guralnick who was former Chairman and Professor of Oral and Maxillofacial Surgery at the Harvard University School of Dentistry.

Sharon P. Turner ('79) has recently been appointed as Clinical Assistant Professor in the Department of Oral Diagnosis.

William F. Vann, Jr. (Pedo '76) (Pediatric Dentistry) presented a paper at the 1986 IADR meeting in The Hague, Netherlands entitled "Composite Restorations for Primary Molars: Three Year Results". Dr. Vann co-authored a second paper presented by **David Moore** ('86) entitled "Effect of the Cavosurface Bevel on Posterior Composite Marginal Leakage". Dr. Moore was awarded IADR travel grant money to attend this meeting.

Vickie P. White (DATE '81) (Dental Ecology) was recently the keynote speaker at the Canadian Dental Auxiliaries Educators Conference in Toronto, Ontario.

John Zuniga has joined the faculty of the Department of Oral and Maxillofacial Surgery as an Assistant Professor. He received his D.D.S degree from Tufts. He completed a general practice residency and oral and maxillofacial surgery training at Strong Memorial Hospital in Rochester. He received a Ph.D. in Neuroscience at the University of Rochester Center for Brain Research. Dr. Zuniga was awarded a Research Fellowship by the American Association of Oral and Maxillofacial Surgery in 1984-85.

Student Updates



Steven B. Andreus

NATIONAL AWARD WINNER - Steven B. Andreus, a dental student at the University of North Carolina at Chapel Hill, is pictured with his entry in the 1986 ADA-Dentsply Student Clinician Program, held in conjunction with the recent annual session of the American Dental Association in Miami, Florida. His clinic, "Glass Ionomers: Liquid vs. Gel Etchants, Effects on Bond Strength and Surface Morphology", was awarded first place in Basic Science and Research, one of two categories in the national competition. Students from nearly every dental school in the nation participated. Steven was able to attend this meeting and participate in this competition as a result of

winning the overall competition at the UNC School of Dentistry's 1986 Student Table Clinic Day courtesy of Dentsply International, Inc. Dr. Harold Heymann, Assistant Professor in the Department of Operative Dentistry was Steven's faculty preceptor for this table clinic. For his first place award at this meeting, Dentsply International provided an expense paid trip to the Chicago Mid-Winter Dental Meeting. He received a B.S. degree in zoology from N.C. State University in 1981 and did postgraduate work at NCSU in 1982 and 1983 while coaching the varsity fencing team. He is a member of the DDS Class of 1988.

Officers for the Spurgeon Dental Society, the student government, of the UNC School of Dentistry were recently elected. **Keith Cox**, Class of 1988, was elected President; **Richard Hunt**, Class of 1989, Vice President; **Maschica Jefferson**, DH Class of 1988, Secretary; and **Sid Sockwell**, Class of 1989, Treasurer.

Class officers for the DDS Classes have also been recently elected:

Class of 1987, President, **Mike Kirsch**; Vice President, **Mary Walton**; Secretary, **Gaye Obermeyer**; Treasurer, **Bennett Houston**; Spurgeon Representative, **Sam Zwetchkenbaum**; Intramural Representatives, **Mike Kirsch** and **Bert Pearce**; Social Chairpersons, **John Wood** and **Donna Hager**; and Honor Court, **Tim Grinder**, **Carol R. Brown**, **Bert Pearce**, and **Sam Zwetchkenbaum**.

Class of 1988, President, **Balint Kokas**;

Vice President, **Fred Keyser**; Secretary, **Monica Reichman**; Treasurer, **Polly Paton**, Honor Court, **Joel Gentry**, **Jay Dugoni**, **Terri Youngblood**, and **Michael Wimberly**; and Spurgeon Representative, **Robert Wilkinson**.

Class of 1989, President, **Mark Scurria**; Vice President, **Sid Sockwell**; Secretary, **Julia Kuhn**; Treasurer, **Paul Coggins**; Intramural Representative, **Todd Smith**; Social, **Meg Lochary** and **Greg Radz**; Spurgeon Representative, **Tammy Lee**; Honor Council, **Paul Coggins**, **Charley Cox**, **Bob Maxwell**, and **Ed Robinson**.

Class of 1990, President, **Greg Weaver**; Vice President, **Jesse Witkoff**; Secretary-Treasurer, **Jim Rokos**; Honor Court Representatives, **Ashley White**, **Barbara Bressert**, and **Sandy McDaniel**; Spurgeon Representatives, **Claire Ferrari** and **Amy Brooks**; Table Clinics, **Jane Wilson**.

UNC Dental Parents Update

The 1987 Dental Parents Day is scheduled Friday, April 10, 1987 in Chapel Hill at the UNC School of Dentistry. Registration will begin at 9:00 a.m. followed by tours of the Dental Education Facilities as well as special programs planned for the parents which include a discussion of post graduate plans, a discussion concerning stress among dental students, and a discussion

of the costs of a dental education. Special programs will be planned for parents of auxiliary students.

A business meeting and luncheon is scheduled for the Carolina Inn beginning at 12:00 noon. Dr. J. B. Machen, Associate Dean for Administration at the School of Dentistry and President of the American Association of Dental Schools will be the featured speaker



UNC Dental Parents' Executive Committee



l to r: Helen Hill installs President James B. Lemmons for the UNC Dental Parents.

Graduate Resident Update

The Department of Pediatric Dentistry is pleased to welcome Dr. **Michael F. Hasty** as a first-year resident. Mike received his DDS degree from UNC-CH in 1986 and his BA in Zoology in 1982. He is a member of the American Student Dental Association, American Society of Dentistry for Children, and the American Dental Association. He was on the Dean's List in 1984.

Michael J. Buckley, a graduate student in Oral and Maxillofacial Surgery, has received a Dental Teacher Training Fellowship from the American Fund for Dental Health. The program offers a two-tiered approach in preparing individuals for a teaching and research career in dental education. The one year program offers a \$20,000 stipend to pursue pedagogical training and research. In

Bruce Egan has been appointed to the position of Clinical Services Manager in the undergraduate patient care program at the UNC School of Dentistry. In this role, Mr. Egan will be initially responsible for managing the daily operations of the Patient Records Department, the Clinical Dispensary, Patient Appointments, Sterilization, and the Cashier's

Sapp, Durham; Janette Windley, Zebulon; Zachary L. Jepko, Mt. Carmel, Pennsylvania.

During the past year, the UNC Dental Parents have supported several continuing education programs designed for the graduating dental student. Subjects covered in these lectures include banking, accounting, practice management, and business law. In cooperation with the Office of Institutional Development, the Placement Service for the UNC School of Dentistry is maintained as well by contributions from the UNC Dental Parents. To support projects of this vital group, contributions may be made to the *Dental Foundation of North Carolina, Inc.*, and mailed to 410 Brauer Hall (211H), UNC School of Dentistry, Chapel Hill, North Carolina 27514. On your check, be sure and earmark your donation to the UNC Dental Parents' Projects.

Registration and program information for the 1987 activities will be mailed in the near future. For additional information, call the Office of Institutional Development, 800/722-1355 (NC only) or 919/966-4563.

accepting these Fellowships, recipients agree to continue to teach full-time for five years following completion of the program. This will ensure a stable and highly qualified pool of educators for the years ahead, responding to the changes in dental technology and education. 1983 graduate of the University of Connecticut, Buckley will assume his Fellowship at the University of North Carolina. Primary funding for these Fellowships is provided by generous contributions from the William J. Gies Foundation, the Great West Life Assurance Company, Omicron Kappa Upsilon, RJR Nabisco, Inc., and Wm. Wrigley Jr. Company who have faithfully supported the Fund's efforts through the years.

Office. Mr. Egan will also be assisting the Clinical Services Committee in planning and implementing support systems for the revised patient care program. Bruce brings to this new position an impressive set of credentials. He received his Bachelor of Arts degree from the University of California at Berkeley in 1974 with a major in Economics and has

Staff Update

pursued graduate courses at George Washington University, with a concentration in Business Administration. He has a strong background in management and operational analysis, having held previous positions with the U.S. Departments of Labor and Energy. During the past year, he has served in a consulting role in the Office of Institutional

Development and the Research Center at the UNC School of Dentistry. In this capacity, Bruce developed and implemented an automated educational tracking program for advanced professional programs and designed and implemented a dental data management system to track and analyze research findings for publication.

1986 Dental Alumni Awards

Elkin Dentist Presented Brauer Award



l to r: Dr. Ben Barker and Dr. James A. Harrell, Sr.

Alumni notes

Dr. James A. Harrell, Sr. was presented the Second John C. Brauer Award during the 1986 Dental Alumni Day activities.

The award, created three years ago, recognizes people who have dedicated their lives to serving dentistry and the UNC School of Dentistry. It is named for the first Dean of the School, Dr. John C. Brauer.

Dean Ben Barker made the award saying, "Dr. Harrell lives with undying regret that a Carolina dental education was not available to him as a legacy of being born too early. I can report with the deepest feelings of gratitude and thanks that he has never allowed this to stand in his way of being one of the School's staunchest supporters and undying advocates.

"He has recognized that the citizens of North Carolina, their oral health and

the profession of dentistry prospers and grows when a strong and vibrant dental school exists."

Harrell is former president of the Academy of General Dentistry and the North Carolina Dental Society as well as the 1985-86 Vice-President of the American Dental Association. He also is a Regent of the American College of Dentistry. At UNC, Harrell has been the President of the Dental Foundation of North Carolina, one of the first Affiliate and Life Members of the UNC Dental Alumni Association, the first recipient of the Dental Foundation's Distinguished Service Award and Chairman of the Dental Foundation's First Annual Giving Campaign. He is President of the UNC General Alumni Association and a member of The Chancellor's Club and the Board of Visitors.

Chandler Presented Distinguished Service Award

Dr. Dudley C. (Chan) Chandler, Jr. of Winston-Salem was presented the 1986 Distinguished Service Award by the UNC Dental Alumni Association. "Chan" is a member of the Class of 1970 and is a periodontist in Winston-Salem. He is a Past President of the Association and the North Carolina Society of Periodontists.

Chandler was cited for his leadership in alumni activities and his help in the 1985-86 fund raising for the Dental Foundation of North Carolina and the UNC School of Dentistry. The award was presented by Dr. James Elliott, President of the Association.

Spillman, Horton Named Honorary Members



l to r: Dr. Keith Bentley makes honorary membership award to Dr. J. Harry Spillman.

Alumni Notes

Drs. J. Harry Spillman of Winston-Salem and Charles Horton of High Point were recently inducted as Honorary Members of the UNC Dental Alumni Association.

Honorary members who are not UNC alumni are chosen for induction after a vote by Association members. They are recognized for their contributions to dentistry and their communities.

Spillman is Past President of the North Carolina Dental Society, the Second District Dental Society, and the Dental Foundation of North Carolina and a former Fellow of the American College of Dentists and the International College of Dentists. He is a graduate of Emory University School of Dentistry.

Don L. Allen ('59) was presented the 1985 William N. Finnegan, III Professor of Dental Sciences Award by the University of Texas Board of Regents.

In Memory
John Lafayette Ashby, Jr.
Class of 1957
1931-1984

Keith Beasley ('84) has been appointed Head of the dental department of the USS Saipan (LHA-Z) whose homeport is Norfolk, Virginia.

Tim Burgiss ('85) served as President of the Foothills Dental Study Club in 1986. He practices in Union Grove.

Larry Cheek ('78) has sold his practice in Rockingham and has recently opened a practice in Calabash.

Jerry Clark ('69) is founder and president of the North Carolina Make a Wish Foundation. Dr. Clark, along with his staff, devotes about 10 to 20 hours a week toward raising funds, prioritizing requests, scheduling events, and other administrative duties. Their goal is to grant 12 to 20 wishes a year for the underprivileged, institutionalized, or homebound person.

Reid Clark ('76) recently presented a lecture to the Pre-Med Society at UNC-G on "Esthetics and New Trends in Dentistry".

Bobby M. Collins ('83) has received the Expert Field Medical Badge after a testing at Fort Bragg. He presented a table clinic, "Dental Treatment and Pregnancy", during the 1986 Thomas P. Hinman Dental Meeting.

W. Arthur Cooper, III ('84) has recently

He is a member of the Forsyth County Board of Health and the Reynolds Health Center Advisory Committee and a former member of the Winston-Salem Model Cities Commission and former Vice-President of the Stratford Rotary Club.

Horton is a Past President of the North Carolina Dental Society, the Dental Foundation of North Carolina and the Wake Forest University Alumni Association. He is a former member of the local chapter of the N.C. Jaycees and a current member of the High Point Civitan Club. Horton also is credited with organizing the Guilford Technical Institute dental hygiene and dental assisting programs.

joined the practice of Dr. **Sidney L. Woody** ('64) in Gastonia. Since his graduation he has been practicing in Concord.

Mark Davis ('86) has recently opened an office on Radio Drive in Lexington.

Leah M. Devlin ('79) has recently been appointed Director of the Wake County Health Department and was selected from more than thirty other applicants. She is heading a department with a \$7.8 million annual budget, 225 employees, and a complex variety of health-related missions in the state's fastest-growing urban area. She hopes to steer her department toward greater involvement in preventive health programs for the general public, care of the aging and the indigent and protection of ground water quality. She also faces the difficult problems of dealing with the relatively high numbers of teen pregnancies and infant deaths in Wake County. Then, too, the county must deal with communicable diseases.

Stephen E. Edgerton ('80) of Wallace recently attended a seminar in Early Orthodontic Diagnosis and Treatment Planning conducted in Nashville, Tennessee by the American Orthodontic Society. The course, which includes 18 hours of lectures and presentation of cases provided Dr. Edgerton and his colleagues with a thorough look at the intricacies of orthodontic treatment of younger patients.

Paul Eleazer ('70) is a Fellow in the American College of Dentists and was the 1986 General Arrangements Chairman for the Georgia State Dental Association Meeting held in Piny



Drs. Deborah and Holt Foushee

Mountain, Georgia in August.

R. Holt Foushee ('82) (Ortho '86) and **Deborah Galle Foushee** (Perio '86) have recently opened a private practice of orthodontics and periodontics in Charlotte.

In Memory
William B. Gilbert
Orthodontics 1962
1922-1986

Flynn Harris ('60) of Charlotte is an associate faculty member at the L.D. Pankey Institute as well as a member of the Board of Directors. He is also a patrol leader for the Sugar Mountain Ski Patrol.

Frederick G. Hasty ('58) has been elected to represent the North Carolina Association of Orthodontists as Trustee to the Southern Society of Orthodontists.

Edward Hickman ('5) has recently assumed the practice of Charles Casher in Lumberton. He has been appointed to the staff of Southeastern General Hospital in Lumberton.

Mark E. Hixson ('74) has returned to private practice of Orthodontics in Raleigh after serving an active tour duty with the U.S. Army for eleven years.

Mark Hyman ('84) has recently joined **Dr. Ted Burnett** ('73) in the practice of family dentistry in Greensboro.

In Memory
Charles M. Johnston
Class of 1955
1925-1986

John R. Kesler ('75) is President of the Rowan County Dental Society.

Harry Lever ('74) has recently been elected President of the Guilford County Dental Society. He practices general dentistry in Greensboro.

Sandy Marks (Pedo '62) has returned to Zaire, Africa to begin a Pediatric Dentistry graduate program at the University of Zaire.

James McGhee ('61) and his staff recently held an open house celebration of his 25 years in dental practice in Thomasville.

In Memory
Thomas M. McLaughlin
Class of 1974
1948-1984

Joe A. Paget, Jr. ('74) of Blacksburg, Virginia recently became a Diplomate of the American Board of Pediatric Den-

tistry and Fellow of the American Academy of Pediatric Dentistry.

James T. Parker ('75) of Benson has been appointed a member of the Committee on Aging for the North Carolina Dental Society and is working with section on Nursing Home and Homebound.

Leon C. Peele, III ('81) has been elected Secretary-Treasurer of the NEH Dental Society for 1986-87. He practices general dentistry in Rocky Mount.

Warren S. (Wes) Perry, Jr. ('78) of Kinston served as the 1986 Co-Chairman of the Lenoir County United Way "225 Plus Club". This Club is made up of individuals who personally pledge a minimum of \$225 to the United Way and was formed a number of years ago as a means of obtaining the upfront support of community leaders for the annual United Way campaign. He has been involved with United Way and its member agencies for a number of years. Perry is Chairman of the Red Cross, is a Boy Scoutmaster, is active with the Chamber of Commerce, Past President of the Kinston Evening Rotary Club, member of Ducks Unlimited, and Secretary-Treasurer of the Lenoir County Dental Society.

June Rose ('57) participated in an exercise conducted by the U.S. Army Reserve where he went to Honduras to carry out a mission of dentistry to provide dental care to a population most of whom had never had any dental care at all during their lives. The Honduran exercise included being airlifted by helicopter into the mountains to give dental treatment to the rural mountain people. The tour of duty occurred during the Honduran dry season with temperatures averaging between 95 and 100 degrees. They were housed in tents with wooden floors without any screens or air conditioning.

Irv Sherman ('72) of East Brunswick, New Jersey has recently been elected President of the New Jersey Association of Pediatric Dentists. He reports that he raced a BMW 2002 in SCCA Racing, Class GT3 and placed second in the North Atlantic Road Racing Championship Race at Lime Rock Race Track.

Brad D. Shinaman ('83) was re-elected as President of the Wilkes County Unit of the American Cancer Society for another two-year term. He was also elected a member of the Board of Directors of the Wilkes United Way Organization for a three-year term.



Dr. Zack Smith



Dr. Bruce Gustafson



Dr. Don Whisonant

Macon M. Singletary ('80) was recently awarded Diplomate status by the American Board of Periodontology at its recent meeting in Dallas. Singletary is a part-time Clinical Assistant Professor at the School of Dentistry and practices in Raleigh.

Henry Zack Smith ('75) (Ortho '77) of Fayetteville has successfully completed all phases of the American Board of Orthodontists' comprehensive examination for certification and has been awarded status as a Diplomate of the American Board of Orthodontics. Also having completed the examination was Dr. **Bruce Albert Gustafson** ('62) (Ortho '64) of Winston-Salem.

C. Jean Spratt ('77) is serving as a regional dentist supervisor for the North Carolina Division of Health Services, Dental Health Section. She is based in Fayetteville and serves the South Central Region.

Michael Spreng ('80) was guest on a local talk show in Ashland, Ohio discussing Halley's Comet. He reports he has been a space enthusiast for twenty years, and he is Ashland's local astronomy authority. He is president of the University Club of Ashland, Secretary of the Ashland Dental Society, and Treasurer of the Ashland Symphony Orchestra Board of Directors.

Mary Paula Zaytoun Steele ('78) has been recently appointed to the Board of Directors for the Foundation for Orthodontic Research in the capacity of Secretary-Treasurer. The Foundation for Orthodontic Research is an international organization of orthodontic specialists who meet regularly to keep up-to-date on the latest research in the field of biology relative to facial growth and development, occlusion, and function of the temporomandibular joint.

Robert C. Steele (Pedo '81) was appointed in 1986 as the Oklahoma Chairman of Children's Dental Health Month. He was elected Secretary-Treasurer of the Oklahoma Association of Pediatric Dentists, and Vice President of the University of Oklahoma College of Dentistry Alumni Association.

Bill Turbyfill, Jr. ('74) (Ortho '76) is Past President of the Cuncombe County Dental Society. He is a member of the Research Committee for the North Carolina Orthodontic Alumni Association.

Marc Vaughn ('76) served as the first

President of the newly created Guilford Technical Community College Faculty Association during 1986. The Faculty Association was established to represent issues pertaining to GTCC's 138 faculty members. Dr. Vaughn has been Chairman of the GTCC Dental Science Division since 1978.

Stephen C. Wallace ('75) of Clearwater, Florida has been named to membership in the Florida Dental Association, West Coast Dental Association, and Upper Pinellas County Dental Association. He is also a member of Countryside Rotary Club.

Bert B. Warren ('61) served as Chairman of the Board of Trustees for the Methodist Home for Children in 1985.

Catherine A. Watkins ('84) has recently received a certificate in the care of geriatric and special care patients after completing a two-year postdoctoral program at the Eastman Dental Center in Rochester, New York. During her second year of study, she was a geriatric fellow in the Department of General Dentistry. She now directs a Geriatric Dental Clinic in Charlotte in association with the Charlotte Memorial Hospital.

Alan Weinstein ('70) has recently presented a paper on "Conservative Cosmetic and Preventive Restorative Dentistry with Enamel Bonding Techniques" at the Sixth National Scientific Congress on Dental Materials and Prevention held in Stresa, Italy on Lake Maggiore. Dr. Weinstein was the only American dentist invited to lecture at this meeting which was attended by over 300 European participating dentists and dental educators. The meeting was sponsored by the Johnson and Johnson Dental Division of Italy. He also presented a full-day program at the 1986 Annual Meeting of the ADA held in Miami, Florida. He is in private practice in Cincinnati, Ohio and is an affiliate staff member of the University of Cincinnati College of Medicine.

Don S. Whisonant ('69) of Beaufort, South Carolina has been elected to the Board of Visitors of the Medical University of South Carolina. Active in the Boy Scouts, he has earned the District Award of Merit, the Woodbadge Award, and subsequently served on the Woodbadge staff in 1981. He also holds the Silver Award (Exploring), the Eagle Award with Silver Palm, and the God and Country Award.

Jefferson D. Whitehead, Jr. ('76) has

1986 Fall Football Day Held

recently announced his association with the firm of Forest Irons and Associates. He is a full partner and Vice-President of the company, having responsibilities in the area of provider training, private practice management, and practice valuation. Whitehead will maintain his private practice in Enfield.

The School of Dentistry upheld its tradition and hosted another successful Fall Football Day on Saturday, November 1. Approximately 600 alumni, faculty members, family members, and friends gathered at the School to participate in the continuing education program and luncheon before going to the UNC-Maryland football game in Kenan Stadium. Many attended the UNC Blue-White basketball game as well.

N. Rouse Wilson, III ('85) has recently purchased the practice of **Lowell Williams** ('57) who has retired after 27 years in Pittsboro.

G. Michael Woodard ('78) and **John C. Woodall** ('78) have formed a group practice for general dentistry in Raleigh.

The program, presented by Leslie Bram, Director of Planned Giving for the University of North Carolina at Chapel Hill (The Carolina Fund), discussed the 1986 tax law reform act and its impact on charitable giving.

The date for the 1987 activity will be available in late May. Watch for this announcement and make plans to participate in this fun-filled day!

Join Us for the 1987 Hinman Reception

The UNC Dental Alumni Association and the UNC School of Dentistry will again host a reception for alumni and friends during the 1987 Thomas P. Hinman Dental Meeting. This reception is scheduled on Friday, March 20, 6:00 p.m. - 8:00 p.m. in the Summit Room of the Atlanta-Marriott Marquis Hotel. We hope to see you there!

Twenty-Second Annual Dental Alumni Day Scheduled April 11, 1987

Details are now being finalized for the Annual Spring Dental Alumni Day, April 11, 1987. A brochure describing the activities in detail will be mailed in the near future. **MARK THIS DATE AND MAKE PLANS TO ATTEND.** The day will again feature a continuing dental education program, student table clinic presentations, the Annual Business Session of the Association in which officers will be elected, the School of Dentistry's Annual Picnic, and a reception honoring Reunion

Classes of '57, '62, '67, '72, '77, and '82. These classes are now working out their details for their respective reunions, and class members will receive separate mailings from your reunion organizer.

Special programs are being planned for auxiliaries by the faculty of the Dental Hygiene, Dental Auxiliary Teacher Education, and Dental Assisting Programs.

Don't forget April 11, 1987 when we hope to see you in Chapel Hill.

MARK YOUR CALENDAR!

The UNC Dental Alumni Association will host its annual alumni breakfast during the annual meeting of the North Carolina Dental Society on Friday, May 1, 1987 at 7:30 a.m. at the Myrtle Beach Hilton. More information will be distributed as the plans are confirmed.

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DH News

Fall semester was busy for both faculty and students in the Dental Hygiene program. Many changes have occurred this year keeping everyone on their toes. The senior class became the first class to routinely apply sealants, take impressions and polish amalgam restorations in clinic. The smallest class in the history of the UNC School of Dentistry, this group of 17 students has benefited from individualized instruction. They are very strong both clinically and didactically.

Dental Hygiene Alumni Association Update

Officers for the UNC Dental Hygiene Alumni Association in 1986-87 are: President, Donna Miller; President-Elect, Lisa Summey; and Secretary-Treasurer, Donna Warren.

The Board of Directors met in November to make plans for the 1987 Alumni Day. The program being planned to deal with "Women's Health Issues." This year's Distinguished Alumnus Luncheon will be in honor of Martha S. Taylor. Martha portrays the ideals of our profession, and we are proud to have her represent UNC.

Another special event planned for

The junior class began patient contact in November with the expected nerves and anxiety. The class is composed of 30 students in the traditional program and 2 students in the Post-Certificate Program. Several students already possess bachelor degrees in other fields, and two are dental assistants from other states. Enrollment is indeed on an upward course!

Alumni Day is the dedication of Alberta Beat Dolan's portrait. The Association and the Dental Hygiene Class of 1986 funded the portrait.

Please make plans to join us. Also please consider joining the Association. Your dues and contributions help fund activities for the students and the School. The Alberta Beat Dolan Scholarship is our most important contribution to the students. The Association's goal is to raise \$1000.00 this year. So please join and share in our worthwhile endeavors.

— Donna Warren

D.A.T.E. Update

Happy New Year! The faculty hope you are having an enjoyable year.

This year has brought some changes for the faculty. Linda Stewart resigned from the School of Dentistry and is now teaching Dental Assisting at the Technical College of Alamance in Haw River. Darlene Sams is now Coordinator of Medical and Dental Continuing Education for Wake AHEC in Raleigh. She continues to be at the School of Dentistry one day a week. Rebecca Scruggs is coordinating the D.A.T.E. Master's program, and Vickie White and Susan Daniel are teaching in both the Dental Hygiene and D.A.T.E. curriculums. Congratulations to Mary George on her first year as Director of Dental Auxiliaries.

Susan Daniel was recently selected as a recipient of an University Junior Faculty Development Award. The award is in the amount of \$3,000 and will fund her

research entitled, "Examiner Reliability of Dental Sealants".

Four students are enrolled in the D.A.T.E. undergraduate program. Judy Robertson graduated in December and is teaching at Fayetteville Technical Institute in Fayetteville. As you know, these are our last students in the undergraduate program.

New students in the D.A.T.E. Masters program include Janeil Anthony, Ethel Gardner Campbell, Maryanne Lux, Deedee McClain, and Cathy Prevo. Maryanne is our only out-of-state resident and comes to us from Buffalo, New York.

Michelle Grose, second year D.A.T.E. student, was selected this past year to serve as a student representative for the Joint Commission on National Dental Examinations Committee on Dental Hygiene.

D.A.T.E. Alumni Update

Susan C. Kataoka, CDT, Assistant Professor of Dental Technology at LSU School of Dentistry in New Orleans, has written and produced a 15 minute videotape entitled "Anatomical Features of the Occlusal Surface". The tape and accompanying workbook has been in-

cluded in the National Association of Dental Laboratories Wealth of Knowledge (WOK) Library. The holdings of the library, in Alexandria, Virginia, are available to NADL members and all certified technicians. The tapes are rated for continuing

Dental Assisting Program Update

education credit for yearly recertification requirements.

Karen Lanier who is now enrolled in the UNC School of Dentistry D.D.S. Program was a 1985-1986 recipient of the Board of Governors Dental Scholars program. Late congratulations to Karen!

Jeannie Martinez recently acquired the position of Director of Dental Assisting at the University of New Mexico. She is a 1982 graduate of the B.S. D.A.T.E. program.

At the 1986 Meeting of the American Association of Dental Schools, the D.A.T.E. Alumni Association sponsored a social. Due to the success of the event, the Association voted to hold a business meeting and social at the AADS

Thirty-two students enrolled in the 1986-87 UNC Dental Assisting program. The following class officers have been elected: Pam Barnes, President; Hanne Weidmann, Vice-President; Victoria Kelly, Secretary-Treasurer; and Stacy Carrick, Spurgeon Society Class Representative.

Six students are enrolled in the Fall 1986 Dental Assisting Specialty Program. Two students are in the Oral and Maxillofacial Surgery Program and four students in the Orthodontics Program.

The Dental Assisting students and faculty participated with Dental Hygiene students and faculty in the Orange County Schools' dental screening program on October 6 and 7.

The UNC auxiliary programs held a reception October 10 to honor the School of Dentistry's staff dental assistants and dental hygienists. The reception celebrated National Dental Hygienists Appreciation Week and National Dental Assistants Appreciation Week. A drawing was held for a \$25.00 gift certificate from Read's Uniforms, and each staff auxiliary received a 16%

Meeting in Chicago, March 9, 1987 at the Hyatt Regency. The business meeting will be conducted from 5:30-6:30 p.m. A social will follow from 6:30-8:00 p.m.

The Third Annual D.A.T.E. Alumni Day will be held on April 11, 1987 at the School of Dentistry. Please plan to attend.

1987 Alumni dues are now being accepted and should be sent to Vickie P. White, UNC School of Dentistry (211H), Brauer Hall, Chapel Hill, NC 27514. The dues are still \$15.00.

Please let us hear from you and inform us of any news that could be shared with other D.A.T.E. Alumni.

— Rebecca R. Scruggs

discount card for merchandise purchased at Read's.

Deborah Robinson, Dental Assisting faculty member, has submitted two abstracts to the American Association of Dental Schools for presentation. Lynn Smith, Dental Assisting faculty member, has submitted an abstract to the International Association of Dental Research and will be presenting the abstract during the special UNC Dental Research in Review Day scheduled February 25 at the School.

Also, Deborah has been appointed to the Dental Assisting National Board Test Construction Committee for the Oral and Maxillofacial Surgery test section. She attended a meeting of this Committee December 13-15 in Chicago.

Faculty Member Pam Klute attended the American Dental Assistants Association's Annual Session in Minneapolis. She represented the dental assisting education as Chairperson of the Dental Assisting Section for the American Association of Dental Schools.

— Lynn Smith

Dent Notes

Trivial Pursuit Question:

What is the most common non-contagious disease in the world?

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"Extended Uses of Dental Floss"

Sometimes the battle to have patients keep their floss handy can be advanced by sharing with them other uses for it:

If they are trying to bake a cake and have many small layers, they normally bake a layer, then slice it in half with a knife horizontally, which can be quite messy and leave a torn, jagged layer. Another method is to make a small slit at the appropriate halfway mark, then take a long piece of dental floss and slide the midpoint of it into the slit. Wrap both ends around the perimeter of the layer exactly at the halfway point, and

cross them on the side opposite the slit. Now gently pull both ends of the floss in the direction they are traveling to cut the layer in a neat clean manner (floss can also make a clean cut thru cheese cake vertically).

Do you have a large collection of old umbrellas that the cloth has torn loose from the spokes. Floss is an excellent thread to sew it back for a long lasting durable hold. It also works well on sewing buttons that demand a lot of use on children's coats or jackets.

— Dr. Van Haywood, Assistant Professor, Department of Fixed Prosthodontics



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Constituent Update

Southern Association of Institutional Dentists Met Recently in Chapel Hill

The Annual Southern Association of Institutional Dentists (SAID) meeting was held at the Carolina Inn in Chapel Hill October 8-10, 1986. The meeting was hosted and planned by Dr. Jack A. Menius, Clinical Professor of Pediatric Dentistry (part-time), and Dr. F. Thomas McIver, Professor of Pediatric Dentistry.

Mr. Albert Singer presented a program on "Balancing a Mentally Retarded Person's Need for Dental Care with His Right to Liberty and Treatment Choices". Mr. Singer, formerly with the North Carolina Governor's Advocacy Council for Persons with Disabilities, is an attorney who has extensive experience in dealing with issues related to developmental disabilities. Because of his experience with the relationship of government to disabled people and his role as parent of a handicapped child, Mr. Singer has a point of view that must

be considered in finding an appropriate balance between a person's need for health care and his right to treatment choices.

Gerald J. Bensberg, Professor of Educational Psychology at Texas Tech University, presented a program on "New Roles for Dentists in the Deinstitutionalization Movement". Dr. Gerald Bensberg is responsible for the existence of the Southern Association of Institutional Dentists. In the late 1960's, Dr. Bensberg observed the very special skills needed by dental professional who work with mentally retarded people in institutions. Also he noted the relative isolation of these dentists. Coupling these factors, he realized the great need for a vehicle to allow the sharing of ideas and continuation of education among the dental professionals at institutions for the mentally retarded. SAID grew out of his perception and vision.

ACD, Carolinas Section Annual Luncheon Held in Pinehurst



l to r: Chancellor Fordham and Dr. James A. Harrell, Sr.

The Carolinas Section of the American College of Dentists held its annual luncheon on Saturday, May 17, 1986 at the Pinehurst Hotel and Country Club.

Dr. Ben Barker, Dean of the UNC School of Dentistry introduced Ms. Toni Weller Powell, Class of 1986, for the honor of the American College Annual Leadership Award. Dr. William A. Mynatt, Chairman of the Carolina's Section, presented her with a cash award along with a plaque of recognition for the most leadership progress during her dental school years.

Dr. Christopher C. Fordham, III, Chancellor of the University of North Carolina, gave a challenging presentation on "Ethics and Professionalism in

These Changing Times". Dr. Fordham was presented a recognition plaque by Dr. James A. Harrell, Sr., for his outstanding leadership to the University of North Carolina, for his high ideals of professionalism, for his competence shown in his continual support of dentistry and the UNC School of Dentistry.

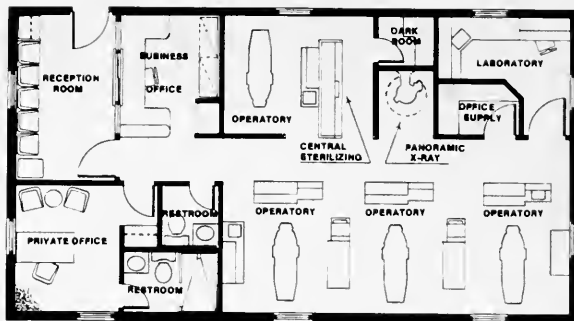
Chairman William A. Mynatt recognized Dr. Lou Earle, Fifth District Trustee of the American Dental Association and Chairman of the Florida Section of the American College of Dentists, and Dr. Jim Harrell, Sr., Regent of the American College for their contributions as outstanding leaders in organized dentistry.

—Robert M. Wilkinson, D.D.S., Vice-Chairman, Carolinas Section

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Calendar of Events

This calendar is updated prior to each publication. Activities are scheduled in Chapel Hill, unless otherwise noted. For further continuing dental education programs, please refer to the CONTINUING DENTAL EDUCATION section. You are invited to notify our office (800-722-1355-NC or 919-966-4563-outside NC) of further activities in your area as well as checking our master calendar of events scheduled for dentistry.

March 1987

- 6-8 ACC Tournament
Landover, Maryland
- 9-11 AADS Meeting
Chicago, Illinois
- 12-15 AADR Meeting
Chicago, Illinois
- 16-17 Second Carolina Conference on
Tooth Enamel Formation
Dental Alumni/School of
Dentistry Reception, Summit
Room, Atlanta Marriott
Marquis, 6:00 - 8:00 pm.
- 20-24 Thomas P. Hinman Dental
Meeting, Atlanta, Georgia
- 27-28 NCDS House of Delegates
Velvet Cloak Inn, Raleigh

April 1987

- 2 Spurgeon Dental Society
Awards Banquet, Location TBA
- 10 UNC Dental Parents Day

- 11 Dental Alumni Day
- 19 Easter
- 30, NCDS Annual Meeting
May Myrtle Beach, SC
- 1-2
- 30 Board of Directors Meeting,
Dental Foundation
Myrtle Beach, SC
- 30 NCAGD Banquet
Myrtle Beach Hilton

May 1987

- 1 Annual UNC Dental Alumni
Breakfast, Myrtle Beach Hilton
- 10 UNC School of Dentistry
Commencement Exercises
Memorial Hall, UNC-CH
Campus
- 29-31 Class of 1954 Reunion
Litchfield Inn
Pawley's Island, SC

June 1987

- 26- Travel and CE Program to
July London and Paris
- 5

July 1987

- 17-22 AGD Annual Meeting
Seattle, WA

September 1987

- 18-20 NCDS I District Meeting,
Green Park Inn, Blowing Rock
NCDS III District Meeting,
Williamsburg, VA
- 25-27 NCDS II District Meeting,
Charlotte Marriott
NDS IV District Meeting,
Myrtle Beach Hilton
NCDS V District Meeting, St.
Regis Hotel, N. Topsail Beach
ADA 16th District Caucus,
Atlanta Airport Caucus

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